

# **SOCIAL CONSIDERATIONS IN ONLINE WORD OF MOUTH**

A Dissertation  
Presented to  
The Academic Faculty

by

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In Partial Fulfillment  
of the Requirements for the Degree  
Doctor of Philosophy in the  
Scheller College of Business

Georgia Institute of Technology  
[August 2014]

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# **SOCIAL CONSIDERATIONS IN ONLINE WORD OF MOUTH**

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Date Approved: June 4, 2014

To my family and friends who have supported me every step of the way.

## ACKNOWLEDGEMENTS

I am deeply, *deeply*, indebted to my adviser Nick Lurie for his guidance and unwavering support throughout the past five years. I could not have asked for a better adviser and what I learned from him I will carry with me for the rest of my academic career.

I am also grateful for each member of my dissertation committee: Sam Bond has provided me invaluable support and as one of the most thoughtful researchers I know, his feedback and advice has helped me push my projects to fruition. I also learned a tremendous amount from working with Jonah Berger. Jonah's ability to think critically and systematically is bar none and working with him has influenced how I approach research questions. Sara Dommer has been a great colleague and made a significant impact on me as a researcher. In addition to giving me great feedback on my projects, Sara has helped me tremendously in sharpening my presentation skills. Last but not least, Sandy Slaughter has been a great mentor. Sandy has supported me professionally and personally and despite being from a different department, Sandy's feedback on my projects was always excellent and thoughtful.

Outside of my committee, I am especially grateful for Ryan Hamilton, Ann Schlosser, and Koert Van Ittersum. I gained unique knowledge from working with Ryan, Ann, and Koert and I am thankful for their insights and patience. More generally, I am grateful for the support of the GT marketing group: Goutam Challagalla, Ajay Kohli, Cem Ozturk, Omar Rodriguez-Vila and Francis Ulgado have offered me much guidance throughout the program and they have helped me develop as a researcher.

I am also grateful to my fellow students who have provided me invaluable support in the past five years. Na (Amy) Wen, Stephen He, Mike Hair, Dan Sheehan, Aditi Bajaj, Myoung-Jin Chae, and Sudipta Mukherjee have helped me with data collection and have provided invaluable feedback on many research projects.

Finally, I am extremely grateful for my wonderful family and friends. They have provided me with unconditional love and support and I dedicate my dissertation to them.

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## SUMMARY

Word of mouth (WOM) – or information shared among consumers themselves – has long been regarded as one of the most influential information sources for consumers (Brown and Reingen 1987). Unlike offline word of mouth, which typically occurs among people who know each other, online word of mouth typically occurs among strangers who do not know, and are unlikely to ever know, one other. While it is reasonable to assume that social concerns, such as maintaining relationships, are likely to influence people's offline word of mouth behavior among familiar others, it is unclear whether social concerns dictate people's online word of mouth behavior.

In my dissertation, I look at how social considerations – thoughts about other people – affect people's online word of mouth behavior. In the second chapter of my dissertation, I examine how people's choice of word of mouth topic online is influenced by social considerations. Specifically, I find that while people enjoy talking about controversial topics because the topics are intrinsically interesting, people often times avoid these topics because they fear social rejection by their conversation partner.

In chapter three, I examine how reviewers' desire to appear logical (vs. imaginative) during word of mouth transmission affects their memory for the experience. I find that attempting to be logical negatively affects reviewer's memory and this is due to the logic mindset activating verbal instead of perceptual processes during subsequent recall. In other words, impression management goals (e.g., to present oneself as a rational person) during word of mouth communication may be detrimental for people's memory .

Chapter four examines how consumer evaluations of reviews are driven by consumer beliefs about *why* reviews are written. I find that, in general, consumers tend to discount positive reviews because they think positive reviews are written for reviewer-specific reason such a self-enhancement or signaling expertise. When temporal contiguity cues – words and phrases indicating that the review was written immediately after the consumption experience – are present, however, people tend to give more credence to positive reviews because these cues make consumers think that the product experience, rather than reviewer-specific goals, precipitated the writing of the review.

Taken together, my dissertation shows that social considerations affect both the transmission of word of mouth and the reception of online word of mouth. More generally, my dissertation showcases how thoughts about others (e.g., *will others be offended?*) influence consumer behavior even in situations where present and future social interactions are unlikely to occur.

# **CHAPTER 1**

## **INTRODUCTION**

Word of mouth (WOM) – or information shared among consumers themselves – has long been regarded as one of the most influential information sources for consumers (Brown and Reingen 1987), above and beyond that of information originating from within the firm (Bickart and Schindler 2001; Katz and Lazarsfeld 1955).

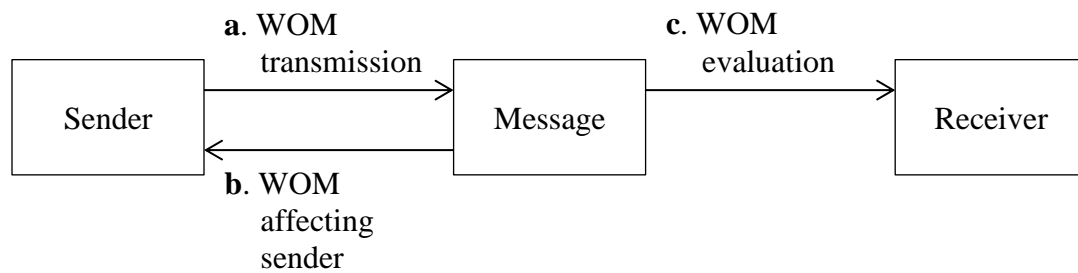
Word of mouth is widespread. Often, it happens without our knowing. For example, we talk to our friends about the latest movie we saw, complain about our aging Nissan Altima, and rave about how generously the bartenders at the local Mexican restaurants pour. At other times, elicitation and transmission of word of mouth is more deliberate. For example, when we are on the market for a new car, we often talk to our friends and family about the car of interest to get their advice; when we are looking for a restaurant to take our out-of-town parents to, we talk to our colleagues for recommendations. In contrast, we are also generous when it comes to sharing product information. When our friends ask us about the smartphone we own, we tell them how much and why we love our phone. When our colleagues ask for a realtor, we are more than happy to recommend our own.

Word of mouth among friends and acquaintances is common and widespread and often occurs without deliberation. Within the last decade, however, consumers are increasingly turning to strangers online for product information. With the advent of consumer review websites such as Amazon and Yelp, sharing and receiving product information has never been easier. While much recent work has focused on documenting

the financial impact of online word of mouth (e.g., Chevalier and Mayzlin 2006; Tirunillai and Telli 2012), little is known about the psychological underpinnings of those who engage in online word of mouth.

One unique characteristic about online word of mouth is that, unlike traditional offline word of mouth, online word of mouth often occurs among strangers. Although social goals, such as maintaining existing relationship (Reis, Clark and Homes 2008), are likely to dictate word of mouth among familiar others, it is unclear whether and how social considerations affect online behavior involving strangers. For example, *why* do consumers share information with strangers? *Why* do they share their product experience in a particular way and not others? *Why* do consumers value some online reviews more than others? Given the increasingly popularity of online word of mouth, understanding the psychological processes that drive sharing behaviors among strangers will ultimately enable marketers to understand, predict, and influence the impact of online word of mouth.

In my dissertation, I explore how social concerns (i.e., thoughts about other people) affect the word of mouth process (see Figure 1) in three essays. Each of the essays are linked by the idea that people communicate and receive information with others in mind, and, as a result, social concerns systematically affect each step of the word of mouth process.



**Figure 1: Word of Mouth Process**

In the second chapter of my dissertation, I look at how people’s word of mouth decisions are driven by social concerns (path **a**: WOM transmission). In my third chapter, I examine how concerns about others affect how people write word of mouth (path **a**: WOM transmission) and how the act of writing word of mouth affects people’s memory for product experiences (path **b**: WOM affecting sender). In the chapter, I look at how receivers’ assessments of word of mouth value are based on the inferences they make regarding sender motivations (path **c**: WOM reception).

The specifics are as follows. Chapter two (Essay 1) examines whether or not people are willing to talk about controversial topics. Using both secondary data and lab experiments, I test the idea that the content of word of mouth (i.e., what people decide to talk about) is driven by how interesting the topic is and people’s desire to avoid social rejection. Contextual factors that reduce the salience of impression management concerns, such as anonymity and relationship closeness, moderate the relationship between controversy and conversation by lowering social rejection concerns.

In chapter three (Essay 2), I examine how persuasive intent affects reviewers’ memories for product experiences. Specifically, I hypothesize that reviewers who use word of mouth to persuade others through logical argument, versus those who seek to provide an image of an experience, will show worse memory for the underlying

experience. This is because the act of writing logical recommendations elicits greater verbal (vs. perceptual) processes, which are less memorable than perceptual processes. As a consequence, those who write logic-based reviews will have worse memory for the actual experience.

Chapter four (Essay 3) examines how review valence affects the value of word of mouth by changing consumer perceptions of reviewer goals. I propose that consumers discount positive reviews more than negative reviews because positive reviews are more attributed to the reviewer. I examine how temporal contiguity cues in reviews—words and phrases indicating temporal proximity between product consumption and review-writing (e.g., “just got back”)—reduce this negativity bias. I find that temporal contiguity cues mitigate the negativity bias by changing beliefs about why positive word of mouth is communicated.

My dissertation provides important insights into word of mouth transmission and impact. In addition to contributing to the substantive fields of controversy in marketing (chapter 2), consumer memory (chapter 3), and negativity bias (chapter 4), my dissertation contributes broadly to word of mouth research by showing how social concerns influence word of mouth transmission *and* impact. Together, the three essays show how social concerns are embedded in the word of mouth process and how concerns about others systematically affect what topics people choose for word of mouth, how people talk about product experiences (and its effect on people’s memory), and how people judge word of mouth.

In terms of word of mouth transmission, chapters two and three suggest that concerns about others affect what topics people *choose* to talk about and *how* they talk

about these topics. In chapter two, I show that conversation topics are driven by the desire to appear interesting while avoiding social rejection. In chapter three, I show that people's motivation to appear logical (vs. imaginative) affects how they write about an experience and that this has downstream implications for their memory for this experience.

On the impact side, my dissertation shows that social concerns affect how word of mouth impacts *both* the sender and the receiver. Specifically, in chapter three, I show that social concerns behind WOM transmission in turn affect sender's own memory for the experience. In chapter four, I focus on the receiver and find that the extent to which people value, and base product decisions on, word of mouth depend on the social inferences they make about the sender.



## **CHAPTER 2**

### **WHEN, WHY, AND HOW CONTROVERSY CAUSES CONVERSATION**

Advertisements, issues, and brands vary in how controversial they are. Old Navy ads, for example, are less controversial than ads for United Colors of Benetton (Passariello and Clark 2011). Topics like the weather are less controversial than abortion and gay marriage. Brands like Quaker Oats and Hallmark are less controversial than Marlboro and Wal-Mart. But does controversy affect whether ads, brands, and other topics are discussed? And if so, how?

Common intuition is that more controversy generates more buzz. Media executives think that controversial television shows (e.g., life at the Playboy mansion) are more likely to be discussed (Steel 2011) and public institutions use controversial ads to try to generate conversation about issues like childhood obesity (Grinberg 2012). Consumers hold similar beliefs. When asked to guess the relationship between a topic's controversy level and people's willingness to discuss it, 91% of pre-test participants indicated that controversy should increase likelihood of discussion (e.g., "controversy sparks conversation" and "if something is controversial, it is bound to be talked about").

But is that actually the case? Are controversial things more likely to be discussed?

Using a mix of field data and laboratory experiments, this paper explores how controversy impacts conversation. I make three main contributions. First, my findings cast doubt on the assumption that more controversy means more buzz. While moderate levels of controversy increase conversation in some cases, high levels of controversy decrease likelihood of discussion. In some cases even moderate controversy decreases

likelihood of discussion.

Second, I illustrate the psychological processes behind these effects. I demonstrate that controversy drives conversation through its dual impact on interest and discomfort. Further, I show that contextual factors like anonymity and closeness of the audience moderate the controversy-conversation relationship by impacting these component processes.

Finally, I shed light on the behavioral drivers of word-of-mouth more generally. While research is beginning to look at why people share some things rather than others (e.g., Berger and Milkman 2013; Berger and Schwartz 2011; Cheema and Kaikati 2010; Wojnicki and Godes 2013), less is known about *when* different drivers of word of mouth matter more or how somewhat opposing drivers might interact. I examine how the basic drivers that underlie controversy combine to shape word of mouth, and how contextual factors moderate these effects by influencing the underlying drivers of discussion.

### **Word-of-Mouth**

Word-of-mouth, and interpersonal communication more broadly, has a huge impact on consumer behavior. It affects everything from the products people buy and websites they join to the diffusion of innovations and information more broadly (Chevalier and Mayzlin 2006; Godes and Mayzlin 2009; Goldenberg et al. 2009; Leskovec, Adamic, and Huberman 2007; Schlosser 2005; Trusov, Bucklin, and Pauwels 2009).

But while research has examined the consequences of word-of-mouth, there has been much less attention to its *causes*, or why people talk about one thing versus another. Research has only begun to look at how content characteristics (Berger and Milkman

2013; Berger and Schwartz 2011) and individual factors (Angelis et al. 2012; Cheema and Kaikati 2010; Wojnicki and Godes 2013) drive conversation (See Berger 2013 for a review). Recent work, for example, shows that more surprising, interesting, and emotionally arousing news articles are more likely to be highly emailed (Berger and Milkman 2013). More accessible or publicly visible products are also more likely to be discussed (Berger and Schwartz 2012).

The current paper adds to this emerging stream of research by investigating how a previous unexplored construct – controversy – affects word of mouth. To do so, I connect controversy to two basic underlying processes, only *one* of which has been identified by past research to drive word of mouth. As discussed below, I demonstrate that controversy drives conversation through interest (Berger and Schwartz 2011) but also discomfort. More generally, my research shows that the complex word of mouth drivers can be understood via the combination of more basic processes. In this case, the effect of controversy – a relatively complex concept – can be understood via basic processes of interest and discomfort.

### **Controversy**

Merriam-Webster (2003) broadly defines controversy as a “discussion marked ... by the expression of opposing views.” Controversial topics are ones on which people have different, often polarizing opinions.

Controversial topics also tend to be issues that people feel strongly about (Boring 1929). People may disagree about which hand soap smells the best, for example, but they are unlikely to find this issue controversial because most people do not care very much about hand soap. Issues like gay marriage, abortion, and stem cell research, however, are

often more controversial because differing opinions are more strongly held. Sometimes these opinions even begin to take on an objective or moral character. Gay marriage advocates, for example, argue legalizing same-sex marriage is the “right” thing to do while opponents argue that same-sex marriage is “wrong.”

Controversy is also in the eye of the beholder. Sports fans, for example, may find a particular draft pick controversial, while non-fans may not. That said, within cultures there is usually some shared consensus about which topics are more controversial. Abortion is a controversial topic in the US, but is less contentious in Sweden (Ralston and Podrebarac 2008).

In sum, controversial issues tend to involve opposing viewpoints that are strongly held.

### **Controversy and Conversation**

I suggest that controversy’s impact on whether something is discussed depends on two countervailing forces. Controversy evokes differences in opinions. As a result, it simultaneously increases interest (which increases likelihood of discussion) and discomfort (which decreases likelihood of discussion).

### **Controversial Topics are More Interesting**

Esteemed biologist George C. Williams once noted that: “controversies is what really makes it interesting in biology” (Roes 1998). A pilot study confirmed that controversy evokes interest even beyond academia. Participants were asked to rate how interesting (1 = not at all, 7 = very) a non-specified topic (“Topic X”) was after being told that it was either highly controversial or not very controversial (between-subjects). Consistent with my theorizing, and people expected the controversial topic to be more

interesting ( $M_{\text{high}} = 5.75$  vs.  $M_{\text{low}} = 4.14$ ;  $F(1, 39) = 12.24$ ,  $p < .001$ ).

Not surprisingly, more interesting things are often more likely to be discussed (Berger and Milkman 2013; Heath, Bell, and Sternberg 2001). People often talk about things is to entertain themselves and others (Heath, Bell, and Sternberg 2001), and interesting things are simply more entertaining. Talking about interesting things also facilitates self-presentation. Just like the cars we drive or the clothes we wear, the things we say influence how others perceive us (Angelis et al. 2012; Berger and Milkman 2013; Wojnicki and Godes 2013). Talking about interesting rather than boring things should make people seem more interesting (Berger and Milkman 2013; Berger and Schwartz 2011).

Taken together, this suggests that controversy boosts interest, which, in turn, increases the likelihood of discussion.

### **Controversial Topics Are Uncomfortable to Discuss**

At the same time, however, controversial topics can be uncomfortable to talk about, especially when conversation partners have opposing views. People want to be socially accepted (Reiss 2004): they want to fit in and have others like them (Baumeister 1998; Goffman 1959). As a result, concerns about others' judgments often affect people's behavior in public situations (Argo, White, and Dahl 2006; Ratner and Kahn 2002).

Controversy tends to draw polarizing, unyielding opinions. While someone may be pro-life, their neighbor may be pro-choice. While someone may be for tax cuts, their friend may be against them. People tend to think they are right and ignore the merits of the opposition (Boring 1929; Henle 1973). Consequently, talking about controversial topics can generate interpersonal conflict and people may feel uncomfortable bringing

them up because they fear social rejection (Buss 1990). Thus, controversy can increase discomfort, which reduces likelihood of discussion.

Taken together, the above discussion leads to the following hypothesis:

H1: Controversy affects likelihood of conversation through increasing interest (which increases likelihood of discussion) and discomfort (which decreases likelihood of discussion).

Thus controversy's overall impact on likelihood of discussion should depend on the relative strength of these two underlying processes.

### **The Moderating Role of Context**

To further test my conceptualization, I also examine whether two factors that should moderate the role of discomfort (i.e., anonymity and relationship closeness) also similarly moderate the controversy-conversation relationship. Interesting topics are likely to remain interesting regardless of whether people's identity is disclosed or whether they are talking to friends or strangers. Discomfort, on the other hand, should be a weaker driver of discussion when social acceptance concerns are either less salient (e.g., talking anonymously) or less threatened by discussion of controversial issues (e.g., talking to friends).

I examine how anonymity and relationship closeness (friend or stranger) moderate the controversy-conversation relationship, and along the way, deepen our understanding of how contextual factors shape word-of mouth.

#### **Anonymity**

People often talk anonymously online (Swidey 2010) and social critics have lamented that anonymity allows people to say nasty, repulsive things that they would not

say if their identity was public (Perez-Pena 2010). Social acceptance concerns should be less salient in these anonymous settings since there is no public “self” that the individual has to manage (Goffman 1959; Ratner and Kahn 2002). Thus discomfort should be a weaker driver of conversation when people are anonymous.

H2: Anonymity should moderate the extent to which discomfort mediates the controversy-conversation relationship. The mediating effect of discomfort should be weaker when people are anonymous.

### **Relationship Closeness**

Not all identity-disclosed contexts, however, are equivalent. When identities are disclosed, people can categorize conversation partners as close (e.g., friend) or distant others (e.g., stranger). Relationship closeness should moderate social acceptance concerns (and thus the role of discomfort) for a few reasons. First, if close others say something offensive, or we disagree with them, it should not impact social acceptance much because that single interaction is unlikely to change our opinion of them. For distant others, however, more is at stake in the current conversation. Interpersonal judgments are more heavily based on the conversation at hand, and as a result, people should feel more uncomfortable bringing up controversial topics.

Second, knowing more about close others enables people to tailor what they say to ensure smooth conversation. Knowing that a friend is pro-life, for example, allows us to shape how we talk about our pro-choice views. As a result, thinking about bringing up a controversial topic should be less daunting with close others.

Third, people are motivated to maintain close relationships (Baumeister and Leary 1995). This gives them the freedom and security to bring up even controversial topics

they find interesting since they know that their friends are willing to overlook minor disagreements and resolve them if they arise.

Overall then, people should feel more comfortable bringing up controversial topics with close others. Consequently, talking to close others should reduce the role of discomfort in driving the controversy-conversation relationship.

H3: Relationships closeness should moderate the extent to which discomfort mediates the controversy-conversation relationship. The mediating effect of discomfort should become weaker as relationship closeness increases.

### **The Current Research**

I use multiple methods to test my theoretical framework. First, I examine the relationship between controversy and conversation using almost 5,000 posts from a real online discussion forum (Study 1). Next, I use lab experiments to test the causal impact of controversy on conversation (Studies 2a and 2b) and to examine the hypothesized mechanisms (i.e., interest and discomfort, Studies 3 and 4). By manipulating anonymity (Study 3) and relationship closeness (friend vs. stranger, Study 4), I investigate how these contextual factors moderate the controversy-conversation link through interest and discomfort.

Consistent with prior research on word-of-mouth drivers (Berger and Schwartz 2011; Liu 2006; Moldovan, Goldenberg, and Chattopadhyay 2011), my key dependent variable is word-of-mouth volume. In Studies 1 and 2a, I look at how controversy relates to how much word-of-mouth content receives (e.g., number of comments posted). In Studies 2a, 3, and 4, I examine how controversy affects people's willingness to talk.



## **Study 1: Field Data**

My first study examines how controversy impacts word-of-mouth in the field. Using data from an online news website (Topix.com), I investigate how the amount of controversy an article evokes impacts the number of comments it receives.

I chose Topix.com for a number of reasons. First, unlike some content specific websites (e.g., sports blogs), Topix covers a wide range of topics from world news and politics to sports and entertainment. Second, drawing more than five million unique visitors (Topix Blog 2008) and over one hundred-thousand comments a day (<http://www.topix.com/topix/about>), Topix is one of the most popular online news destinations. Note that Topix allows people to comment without disclosing their identity.

Third, and most importantly, the design of the Topix website allows me to avoid potential confounds due to article featuring. Most online news sites feature articles differentially based on their content. The New York Times, for example, puts certain articles at the top of its homepage and hides others behind a trail of links. Preferential featuring influences how much attention articles receive (Berger and Milkman 2013), which likely impacts the number of comments they collect. Topix.com, however, does not have this issue. News stories are placed at the top of the page as they come in, which eliminates the possibility that controversial articles receive more comments merely because they are placed in more prominent places on the website.

## **Data and Coding**

First, I collected data on all articles ( $N = 208$ ) that appeared in the world news, US news, US politics, business, sports, and entertainment sections of Topix.com over a two day period (January 24<sup>th</sup>-25<sup>th</sup>, 2011). The articles cover a wide range of topics (e.g.,

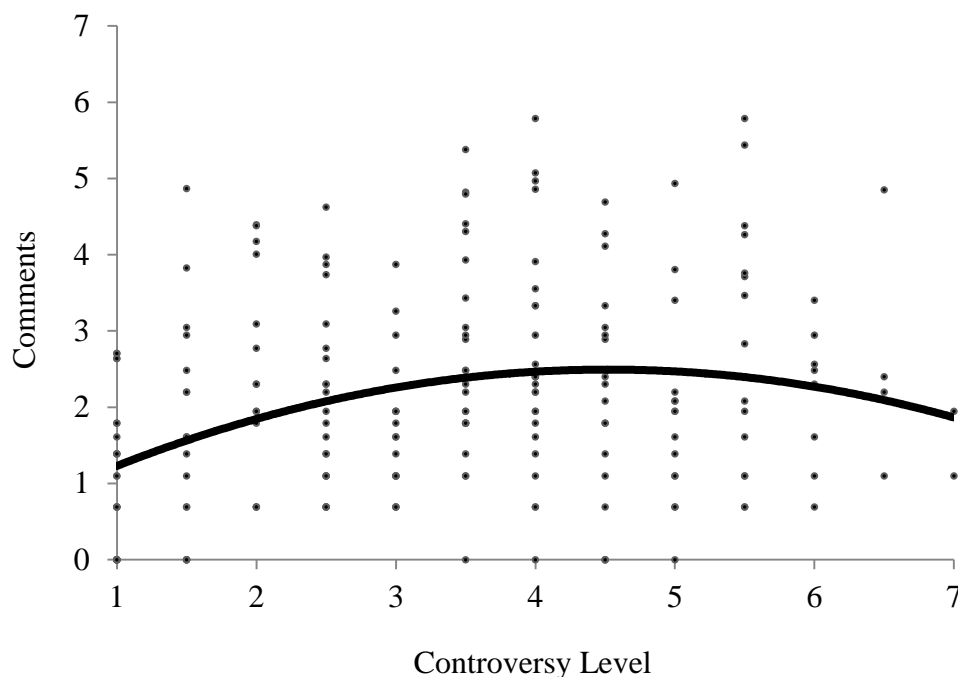
immigration policy, Google, and politics in Afghanistan).

Second, I coded how controversial each article was. I gave two independent raters a definition of controversy (i.e., “the extent to which a topic allows for dispute, debate, and differing opinions”), and asked them to code how much controversy each article evoked (1 = not at all controversial, 7 = very controversial). Different coders’ ratings were reasonably correlated ( $r = .68$ ) and averaged to form a controversy score. Examples of low controversy articles included “New hybrid whale discovered in arctic.” Examples of moderately controversial articles included “NY bill would ban ‘e-cigarettes’ until FDA action.” Examples of highly controversial articles included “Oklahoma senator wants open carry, firearms on campus.”

Third, I collected the number of comments each article received. New comments were unlikely to trickle in after the first couple weeks so I recorded all comments each article received in the 15 days post release (4,741 total comments, mean per article = 22.79). The distribution of comments was highly skewed (skewness = 3.90, kurtosis = 18.67), so I took the log for my analyses. A small number of articles had no comments, and because the log of 0 is undefined, I took the log of (number of comments + 1) to retain these articles.

To allow for potential non-linearities in the relationship between controversy and likelihood of discussion I regress the number of comments both on controversy (linear) and controversy-squared.

## Results



**Figure 2: Relationship Between Controversy and Conversation (Study 1)**

Results indicate an inverted-U relationship between controversy and conversation.

While controversy has a positive linear relationship with the number of comments an article receives ( $\beta_{\text{controversy}} = .92$ ,  $SE = .26$ ,  $t(205) = 3.59$ ,  $p < .01$ ), it has a negative quadratic relationship ( $\beta_{\text{controversy}^2} = -.10$ ,  $SE = .04$ ,  $t(205) = -2.84$ ,  $p < .01$ ). As shown in figure 2, low levels of controversy seem to increase conversation. But past a certain point, additional controversy fails to increase (and even decreases) conversation.

The reversal is particularly noteworthy given the moderate level at which the effects start to reverse. While one might imagine that people avoid talking about extremely controversial things (e.g., partial-birth abortions), results indicate that additional controversy decreases conversation starting at a moderate levels of controversy. Taking the first derivative of my model and setting it to 0, I find that the

inflection point at which addition controversy starts to decrease conversation is at 4.6, which is not far past the scale midpoint (4).

### Robustness Checks

These results persist ( $\beta_{\text{controversy}} = .67$ ,  $SE = .27$ ,  $t(197) = 2.45$ ,  $p < .05$ ;  $\beta_{\text{controversy}^2} = -.07$ ,  $SE = .04$ ,  $t(197) = -2.01$ ,  $p < .05$ ) controlling for each article's general topic (e.g., US politics or sports) and length (word count). This casts doubt on the possibility that my results are driven by more people reading certain types of articles (e.g., politics), which also happen to be more controversial. It also casts doubt on the notion that controversial articles are somehow longer or shorter, and this is what is driving the number of comments, rather than controversy itself.

The results also persist controlling for arousal, emotionality and positivity (Berger and Milkman 2013). Three sets of two independent coders rated each article on each dimension using a 1-5 scale, but the curvilinear impact on controversy on conversation remains even controlling for these factors ( $\beta_{\text{controversy}} = .90$ ,  $SE = .28$ ,  $t(202) = 3.28$ ,  $p < .01$ ,  $\beta_{\text{controversy}^2} = -.10$ ,  $SE = .04$ ,  $t(202) = -2.75$ ,  $p < .01$ ).

My results are also robust to data transformation and model selection. When I regress the untransformed comments data on controversy and controversy-squared using a negative binomial regression (Greene 2008a), I find identical results. A positive linear effect ( $\beta_{\text{controversy}} = 1.23$ ,  $SE = .31$ ,  $z = 3.99$ ,  $p < .01$ ) and negative effect of controversy squared ( $\beta_{\text{controversy}^2} = -.13$ ,  $SE = .04$ ,  $z = -3.15$ ,  $p < .01$ ). This suggests that my findings are not due to the model form used.

### **Discussion**

Analysis of a news website indicates that, contrary to popular belief, controversy

doesn't always increase discussion. While moving from low to moderate controversy increases the number of comments an article receives, additional increases in controversy decrease conversation. Further, the results show that this isn't simply driven by people not commenting on extremely controversial articles. Comments decrease even at a moderate level of controversy.

One might argue, however, that my results are not driven by increased likelihood of commenting but by more back-and-forth among a smaller number of posters. Ancillary results cast doubt on this possibility. For a subset of articles, I counted the number of unique posters and regressed it on controversy and controversy-squared using a negative binomial regression. Results show that, like comments, the number of unique posters is related to controversy via an inverted U-relationship ( $\beta_{\text{controversy}} = .66$ ,  $SE = .31$ ,  $z = 2.14$ ,  $p < .05$ ;  $\beta_{\text{controversy}^2} = -.08$ ,  $SE = .04$ ,  $z = -1.99$ ,  $p < .05$ ). Thus while controversy may also impact the number of comments each person posts, it does not appear to be driving the results observed here.

To more thoroughly rule out the possibility that unobserved variables are driving my results, I turn to experiments. They allow me to conduct clean causal tests, examine the hypothesized underlying mechanisms, and manipulate moderators.

### **Study 2a: Controversy in Real Laboratory Interactions**

Study 2a uses a tightly controlled laboratory setting to test the causal impact of controversy on likelihood of discussion. By manipulating controversy, and measuring its impact on what people talk about, I can directly examine the effect of controversy on conversation.

Participants listed topics they found low, moderate, and high in controversy and

then picked one to talk about in a real conversation with another lab participant. I use a similar conversation context to the field study (anonymous and online) to see whether results are similar (i.e., participants prefer to talk about moderately controversial topics).

## **Methods**

Two-hundred and ninety-six students participated for pay. After arriving in the lab, they were seated at desktop computers, separated by dividers.

First, participants generated topics of varying controversy levels. To ensure the topics were as similar as possible on other dimensions aside from controversy, participants were prompted to list a broad topic that comes up in current events. Then they were asked to list three subtopics, one that was low, moderate, and high in controversy. Under the broad topic of welfare, for example, participants listed topics like food stamps, unemployment benefits, and universal health insurance. A pre-test shows that this manipulation had its intended effects. Participants in the low controversy condition rated their subtopic as lower in controversy ( $M = 2.87$ ) than participants in the moderate controversy condition ( $M = 5.13$ ), who rated their subtopic as lower in controversy than participants in the high controversy condition ( $M = 6.21$ , all pairwise comparisons significant at  $p < .01$ ).

After listing topics, participants were informed that they would have an anonymous online conversation (via instant messenger) with another participant in the lab, where neither would know the other's identity. Participants picked one of the subtopics they listed to talk about. Then a chat window popped up and participants were informed that their conversation partner was ready to begin. Participants started the conversation by writing their opinion on the self-selected topic. After sending the

message, participants were told that was an odd number of participants in the session so they would unfortunately be unable to continue the conversation.

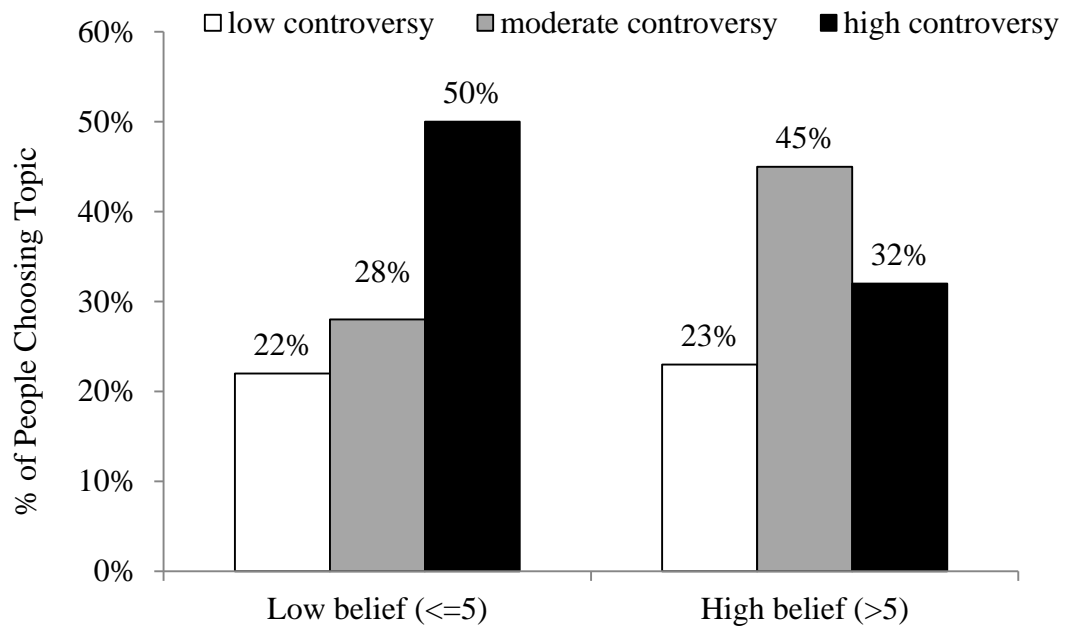
Given my theorizing about how discomfort shapes the controversy-conversation link, I also conducted a manipulation check to ensure that participants believed they would interact with another participant (1 = did not think I was going to, 7 = did think I was going to).

## Results

I had hoped that all participants would believe they were engaging in a real interaction, but unfortunately this was true for only about half the participants. While less than ideal in some ways, this split provides an opportunity to more rigorously test my hypotheses. Discomfort should only kick in at all for those who were sure they were going to have a conversation with another person. For these individuals, I expect an inverted-U relationship between controversy and conversation as discomfort should reduce willingness to talk about high controversy topics. For participants who did not expect real conversation, however, I expected a strictly positive relationship between controversy and conversation as topic choice should be driven solely by interest. To test these ideas, I performed a median split on belief (low belief: scores < 5; high belief: score > 5).

As expected, belief moderated the controversy-conversation relationship ( $\chi^2(2) = 9.85, p < .01$ ). For participants who believed they were going to have a real conversation (and thus discomfort should kick in), I observe the predicted inverted-U pattern ( $\chi^2(2) = 11.42, p < .01$ ): participants were more likely to choose moderately controversial topics (45%) than non-controversial topics (23%,  $\chi^2(1) = 11.04, p < .01$ ) and extremely

controversial topics (32%,  $\chi^2(1) = 3.53, p = .06$ ). There was no difference in choice of the non- and extremely controversial topics (23% vs. 32%,  $\chi^2(1) = 2.18, p > .10$ , see Figure 3). In contrast, among participants who did not believe that they were going to have a real conversation (and thus discomfort should be less important), there was the expected positive relationship between controversy and conversation (low: 22%, moderate: 27%, and high: 51%;  $\chi^2(2) = 12.55, p = .002$ ). These results are not sensitive to the cutoff criteria used.



**Figure 3: Relationship Between Controversy and Conversation as a Function of Belief in Conversation (Study 2a)**

I find similar results if I create three binary choice variables (indicating if people chose the low, moderate, or highly controversial topic) and regress each on the participant's belief score. Results show that as belief increases, choice of highly controversial topic decreases ( $\beta = -.12, SE = .06, p = .05$ ) but choice of the moderate topic increases ( $\beta = .13, SE = .06, p = .04$ ). Choice of low topic is unaffected ( $\beta = -.01, SE$



= .07,  $p > .8$ ). In other words, as belief (i.e., discomfort) increases, people shy away from highly controversial topics in favor of moderately controversial ones.

### **Study 2b: Controversy in the Lab**

Study 2b utilizes more experimental control, testing whether my results hold when all participants are given the same low, moderate, and highly controversial topics. I identified a set of conversation topics, from the same overall domain, that varied in controversy. Then I exposed participants to one of these topics and measured how likely they would be to discuss it.

### **Methods**

#### Pre-Test

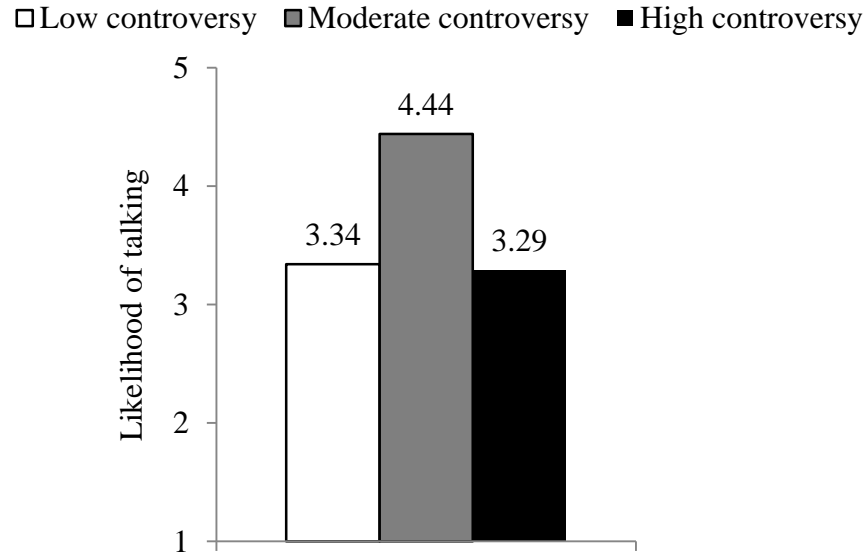
To generate a set of related conversation topics that varied in controversy, I first chose one broad conversation topic (i.e., women's rights) and then listed a variety of relevant subtopics (e.g., right to abortion and right to own property). Pre-test participants ( $N = 21$ ) rated how controversial these subtopics were (1 = not at all, 7 = very). A repeated measures ANOVA yielded three suitable subtopics: women's right to own property (low controversy,  $M = 1.29$ ), women's right to equal pay (moderate controversy,  $M = 3.52$ ), and women's right to abortion (high controversy,  $M = 6.38$ ;  $F(2, 18) = 225.57$ ,  $p < .01$ , all pairwise comparisons significant at  $p < .01$ ).

#### Main Study

One hundred and twenty participants from an online pool completed the study. To keep the conversation context similar to that of our field study, participants were asked to imagine having an anonymous online conversation with a group of strangers. Participants

were randomly assigned one of the three pretested subtopics (low, moderate, or high controversy) and were asked how likely they would be to talk about it (1 = not at all likely, 7 = very likely) in the situation described.

## Results



**Figure 4: Effects of Controversy on Likelihood of Conversation (Study 2b)**

There was a significant effect of controversy ( $F(2, 117) = 3.35, p < .05$ , see figure 4). Consistent with the findings of my field study, a moderate level of controversy increased likelihood of discussion ( $M_{\text{moderate}} = 4.44$  vs.  $M_{\text{low}} = 3.34, F(1, 117) = 14.86, p < .05$ ), but additional controversy hurt likelihood of discussion ( $M_{\text{high}} = 3.29$  vs.  $M_{\text{moderate}} = 4.44, F(1, 117) = 5.12, p < .01$ ). There was no difference in likelihood of discussion between the low and high controversy topics ( $F < 1$ ).

## Study 2a and 2b Discussion

Replicating the results of the field study, Studies 2a and 2b further illustrate that

controversy does not always boost likelihood of conversation. While a moderate amount of controversy increased the likelihood of conversation, additional controversy decreased the likelihood of conversation. Showing these effects using real interactions, as well as with both pre-tested and participant selected topics, speaks to their generalizability.

Ancillary data further underscores the notion that arousal is not driving these effects. Participants in Study 2b also rated the topic they were assigned (low, moderate, or high in controversy) on arousal using measures from Berger (2011) and Berger and Milkman (2013). There was no effect of controversy on arousal ( $F < 1, p > .30$ ). This underscores the ancillary results of Study 1 and casts strong doubt on the notion that arousal is driving my effects.

### **Study 3: The Moderating Role of Anonymity**

Study 3 tests the underlying processes behind the observed effects. I have suggested that controversy drives conversation via two distinct, countervailing routes. Controversial topics are more interesting (which should increase likelihood of discussion) but can also be uncomfortable to talk about (which should decrease the likelihood of discussion). Thus, I measure each of these variables to test whether the overall effect of controversy on likelihood of discussion is driven by the confluence of these two opposing mechanisms.

I further test these underlying processes by examining the moderating role of anonymity. While online platforms like Topix allow anonymous posts, many websites (e.g., The Wall Street Journal) are increasingly requiring identity disclosure. I suggest that the impact of anonymity will depend on how it affects the hypothesized underlying processes. As discussed, while anonymity should have little effect on how interesting a topic seems, it

should decrease the role of discomfort as a driver of conversation.

## **Methods**

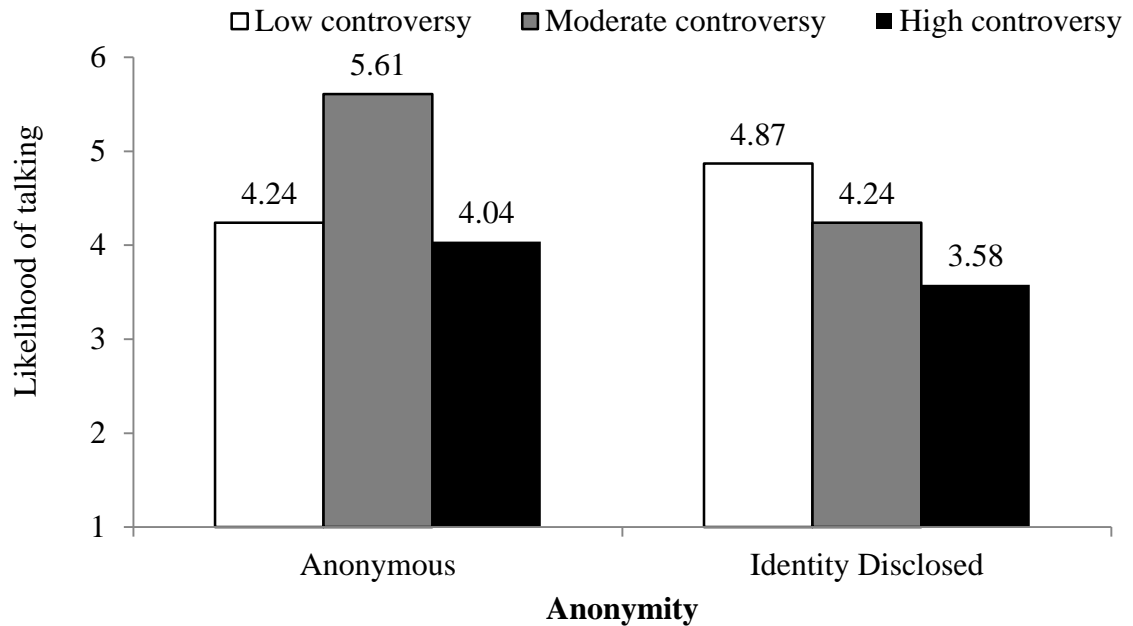
One hundred and forty-six participants from an online pool were randomly assigned to a condition in a 2(anonymity: anonymous vs. identity disclosed)  $\times$  3(controversy: low vs. moderate vs. high) between-subjects design. Similar to Study 2a, participants were asked to list a broad topic and then three subtopics that vary in controversy. They were then asked to imagine having an online conversation with strangers.

The only difference between conditions was anonymity. In the anonymous condition, participants were told that they were chatting using untraceable nicknames and that no personal information was available. In the identity disclosed condition, participants were told that they were chatting using real names and that others could find out personal information about them.

In both conditions, participants were randomly assigned one of the three subtopics they listed previously (low, moderate, or high controversy), and were asked how likely they would be to talk about it (1 = not at all likely, 7 = very likely).

To test the hypothesized mechanisms, I asked participants to rate how interesting they found the subtopic (1 = not at all interesting, 7 = very interesting) and how comfortable they would feel talking about it in the condition described (1 = very uncomfortable, 7 = very comfortable, reverse coded as discomfort).

## Results



**Figure 5: Effect of Controversy and Anonymity on Conversation (Study 3)**

### Likelihood of Discussion

A 2(Anonymity)  $\times$  3(controversy) between-subjects ANOVA reveals a anonymity  $\times$  controversy interaction ( $F(2,140) = 3.14, p < .05$ , see Figure 5).

Consistent with first three studies, when behavior is anonymous, controversy had an inverted-U impact on likelihood of discussion ( $F(2, 140) = 4.47, p = .01$ ). Moving from low to moderate levels of controversy increased likelihood of discussion ( $M_{\text{low}} = 4.24$  vs.  $M_{\text{moderate}} = 5.61, F(1, 140) = 5.87, p < .05$ ). Beyond that point, however, additional controversy decreased likelihood of discussion ( $M_{\text{moderate}} = 5.61$  vs.  $M_{\text{high}} = 4.04, F(1, 140) = 7.56, p < .01$ ). There was no difference between the low and high controversy conditions ( $F < 1$ ).

When identity was disclosed, however, controversy decreased likelihood of discussion ( $F(2, 140) = 2.68, p = .07$ ). While the differences between low and moderate

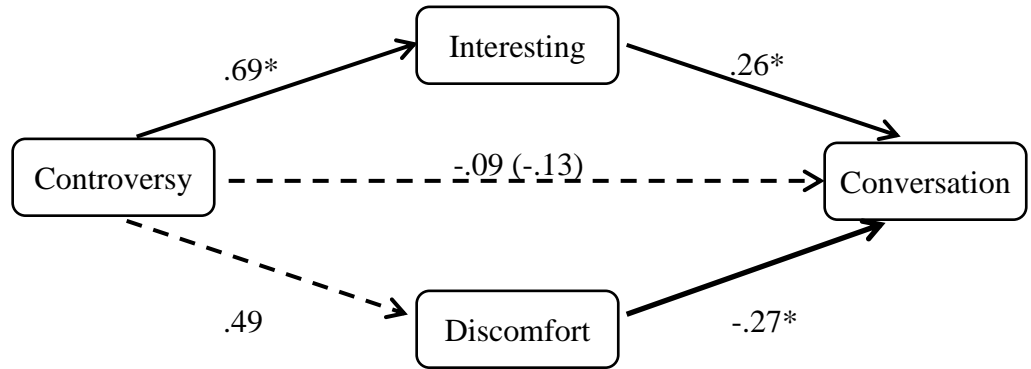
( $M_{\text{low}} = 4.87$  vs.  $M_{\text{moderate}} = 4.24$ ,  $F(1, 140) = 1.1$ ,  $p > .10$ ) and moderate and high controversy topics ( $M_{\text{moderate}} = 4.24$  vs.  $M_{\text{high}} = 3.58$ ,  $F(1, 140) = 1.47$ ,  $p > .23$ ) are not significant by themselves, there was a linear trend: people were significantly less likely to talk about high controversy topics than low controversy ones ( $M_{\text{high}} = 3.58$  vs.  $M_{\text{low}} = 4.87$ ,  $F(1, 140) = 5.35$ ,  $p < .05$ ).

### Underlying Processes

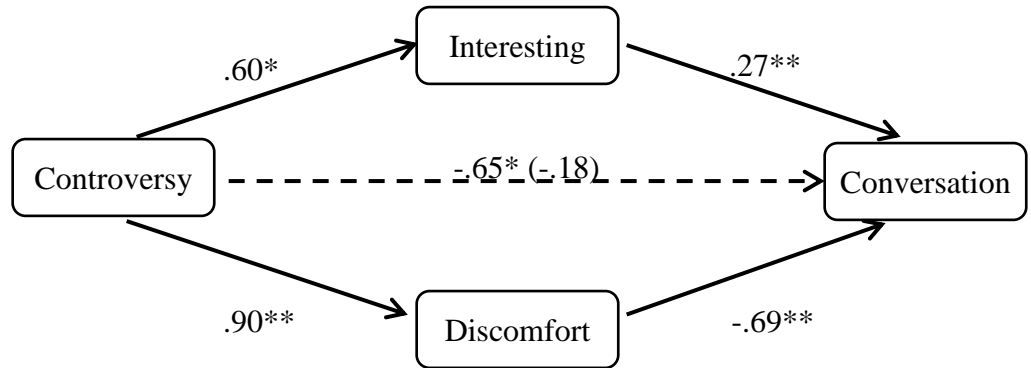
To examine whether interest and discomfort are driving my results, and that anonymity moderates the mediating role of discomfort, I performed two different sets of mediation analyses. I used biased-corrected bootstrapping ( $n = 5000$ , see Briggs 2006; Preacher and Hayes 2008 for a discussion on the advantages of this method) to generate 95% confidence intervals around these indirect effects (interest and discomfort), where successful mediation occurs if the confidence interval doesn't include zero (Hayes 2009; Preacher, Rucker, and Hayes 2007).

First, I performed separate mediation analyses for the anonymous and identity disclosed conditions, simultaneously testing interest and discomfort as mediators. For both conditions, the effect of controversy on likelihood of discussion via interesting is significant and positive (Anonymous: 95% CIs: .01 to .57; Identity Disclosed: 95% CIs: .03 to .44). Discomfort, however, more strongly mediates the controversy-conversation relationship in the disclosure condition (Identity Disclosed: 95% CIs: -1.03, to -.28; Anonymous: 95% CIs: -.53 to .03; see figure 6 for path coefficients). Supporting H1 and H2, these results show that interest and discomfort mediate the controversy-conversation relationship (H1) and that discomfort acts as a weaker driver of conversation when people are anonymous (H2).

*Anonymous*



*Identity Disclosed*

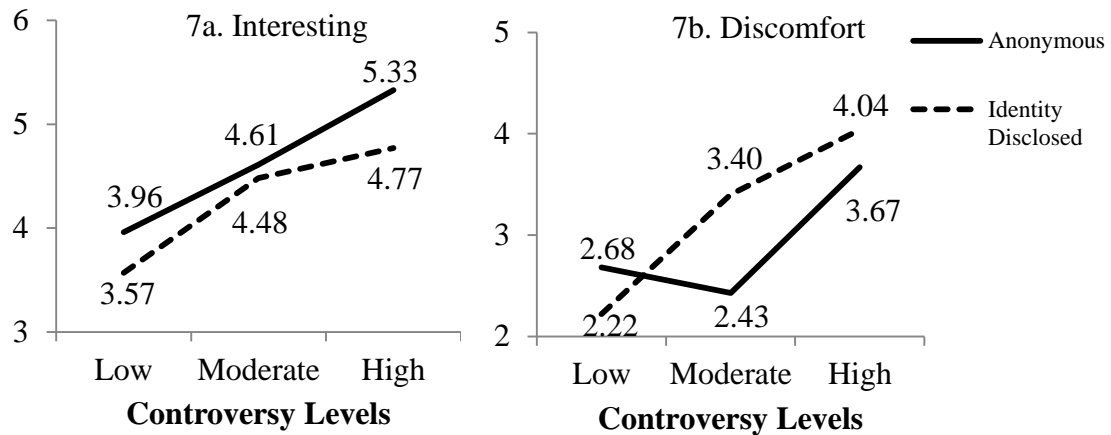


**Figure 6: Mediating Roles of Interest and Discomfort as a Function of Anonymity (Study 3)**  
 \* indicates significance at 5%, \*\* indicates significance at 1%

Second, a moderated mediation (Preacher, Rucker, and Hayes 2007) over discomfort, with anonymity as moderator, yields similar results. Further, supporting H2, anonymity and discomfort interact to affect conversation (anonymity coding: 0 = anonymous, 1 = identity disclosed;  $\beta = -.38$ ,  $SE = .16$ ,  $t(139) = 2.41$ ,  $p < .05$ ). Conditional indirect effects show that discomfort matters more in the identity disclosed condition (95% CIs: -1.08 to -.31) than in the anonymous condition (95% CIs: -.54 to .01). Again, the role of discomfort is weaker under anonymity.

Finally, further illustration of how interest and discomfort combine to drive

conversation can be seen by looking at their relative values across different anonymity and controversy conditions (figure 7). For both conditions, controversy increases interest (figure 7a). When there is identity disclosure, this increase in interest is dominated by increases in discomfort (2.22 to 3.40 to 4.04, see figure 7b dotted line). As a result, I see a net negative relationship between controversy and likelihood of talking. In the anonymous condition, however, discomfort doesn't increase until the topic is highly controversial (2.68 to 2.43 to 3.67, see figure 7b solid line). As a result, I see an inverted-U relationship because discomfort doesn't counteract the positive effect of interest until the topic is highly controversial. These results underscore my suggestion that anonymity affects the controversy-discussion relationship by affecting the underlying process of discomfort but not interest.



**Figure 7: Interesting and Discomfort as a Function of Controversy and Anonymity (Study 3)**

## Discussion

Study 3 extends the findings of the first two studies to provide deeper insight into the processes behind, and moderators of, the observed effects.

First, reinforcing the findings of Studies 1 and 2, I find that in anonymous online



setting, controversy has a curvilinear impact on likelihood of conversation. Controversy increases likelihood of conversation up until a moderate level of controversy, after which point additional controversy decreases conversation.

Second, I demonstrate that two opposing underlying mechanisms, interest and discomfort, drive the effect of controversy on likelihood of discussion. Further, I demonstrate that anonymity moderates the controversy-conversation link through impacting these underlying processes. When people do not have to reveal their identity, moderate controversy increases conversation because it increases interest without increasing discomfort. When people have to reveal identity however, controversy fails to increase and actually decreases conversation because it makes people feel uncomfortable.

The results also cast doubt on alternative explanations. One could argue that my results are somehow driven by knowledge or topic importance, but these explanations cannot explain why anonymity would moderate the effects. How much people know about topics and how important they find topics to be should not change as a function of identity-disclosure and so these explanations alone cannot explain the interactive pattern of results.

#### **Study 4: The Moderating Role of Relationship Closeness**

Study 4 further tests the underlying processes behind these effects by investigating the moderating role relationship closeness. Given that relationship closeness only matters when there is identity-disclosure, Study 4 uses a face-to-face setting where disclosure is inevitable. I also examine the context of offline communication to examine the generalizability of my results.

As discussed previously, discomfort should play less of a role in driving

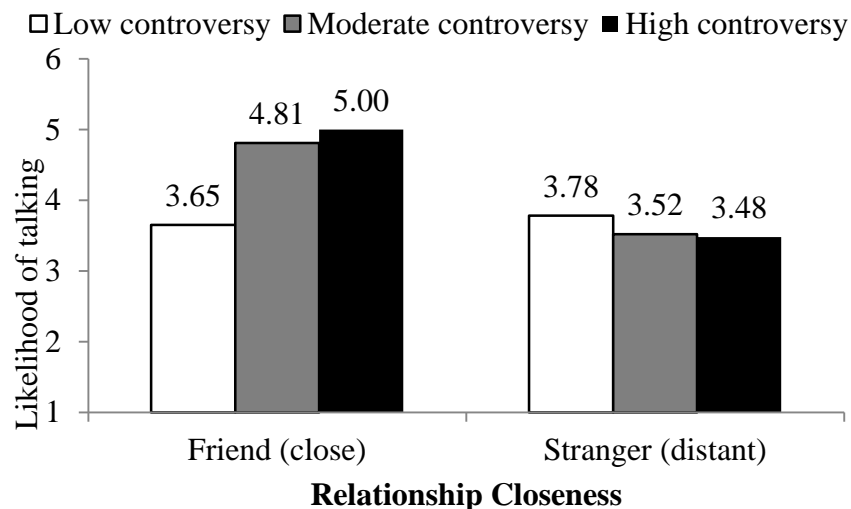
controversy's impact on conversation when social acceptance concerns are reduced. Consequently, discomfort should play less of a role when talking friends than strangers.

## Methods

Forty-nine participants from an online pool completed the study. Again, I first asked the participants to list a general topic and then three subtopics that varied in levels of controversy (low, moderate, and high).

Next, I manipulated relationship closeness. I randomly assigned participants to imagine having a face-to-face conversation with either a friend (close relationship) or a stranger (distant relationship). Then participants rated the likelihood of discussing each of the three subtopics (presented in random order), how interesting they found each subtopic to be, and how comfortable they would feel talking about each subtopic (using the measures from Study 3).

## Results



**Figure 8: Effect of Controversy and Relationship Closeness on Conversation (Study 4)**

### Likelihood of Discussion

A 3 (controversy)  $\times$  2 (relationship closeness) mixed linear model revealed a significant controversy  $\times$  relationship closeness interaction ( $F(2,94) = 3.48, p = .04$ ; see figure 8).

When talking to friends, controversy increases likelihood of discussion ( $F(2, 94) = 4.94, p < .01$ ). A move from low to moderate levels of controversy significantly increases conversation likelihood ( $M_{\text{low}} = 3.65$  vs.  $M_{\text{moderate}} = 4.81, F(1, 94) = 6.21, p < .03$ ). Further increases in controversy did not yield any additional positive effect ( $M_{\text{moderate}} = 4.81$  vs.  $M_{\text{high}} = 5.00, F < 1$ ).

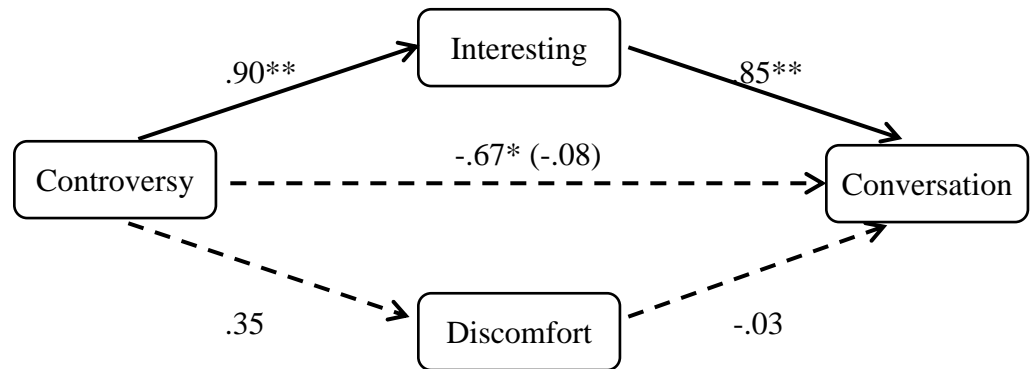
When talking to strangers, however, there was no direct effect of controversy on conversation ( $F(2,94) = .22, p = .80$ ). People reported being equally likely to talk about low, moderate, and highly controversial topics ( $M_{\text{low}} = 3.78, M_{\text{moderate}} = 3.52$  vs.  $M_{\text{high}} = 3.48$ , all pairwise comparisons insignificant at  $p > .50$ ).

### Underlying Processes

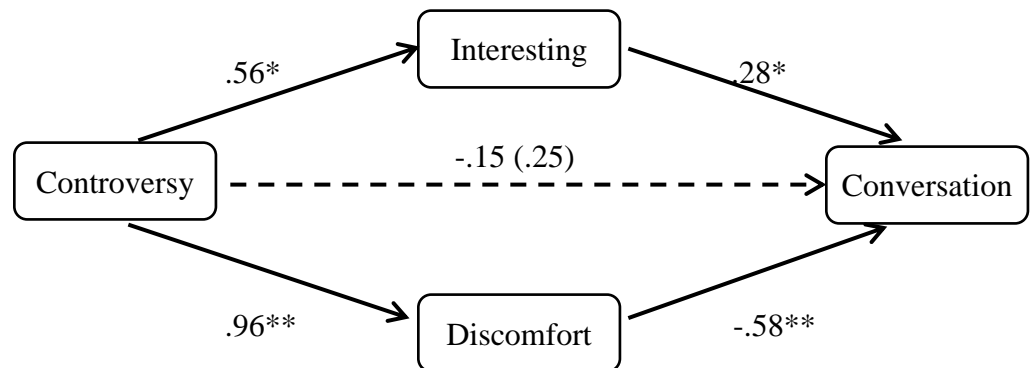
Once again I simultaneously test interesting and discomfort as indirect effects using biased-corrected bootstrapping ( $n = 5000$ , 95% confidence interval).

First, I performed separate mediation analyses for the friend and stranger conditions. For both conditions, the effect of controversy on likelihood of discussion via interest is significant and positive (Stranger: 95% CIs: .02 to .44; Friend: 95% CIs: .32 to 1.21). The mediating effect of discomfort, however, is stronger in the stranger condition (Stranger: 95% CIs: -.99 to -.21; Friend: 95% CIs: -.12 to .02; See figure 9 for path coefficients). Supporting H3, this shows that discomfort becomes a weaker driver of conversation as relationship closeness increases.

*Close Relationship (Friends)*



*Distant Relationship (Strangers)*



**Figure 9: Mediating Roles of Interestingness and Discomfort as a Function of Relationship Closeness (Study 4)**

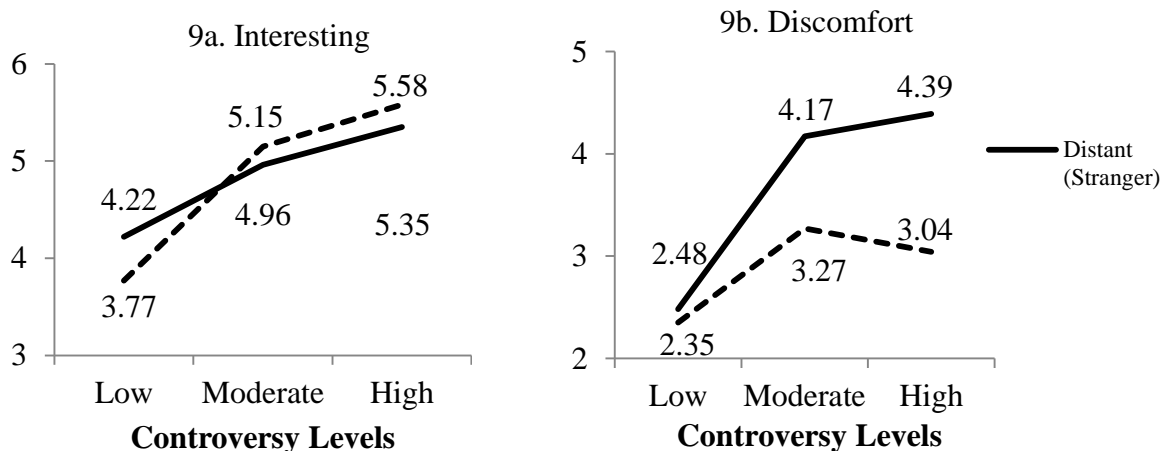
\* indicates significance at 5%, \*\* indicates significance at 1%

A moderated mediation (Preacher, Rucker, and Hayes 2007) over discomfort, with relationship closeness as moderator, shows similar results. Specifically, I find that relationship closeness and discomfort interact to affect likelihood of discussion (closeness coding: 0 = stranger, 1 = friend;  $\beta = .45$ ,  $SE = .16$ ,  $t(138) = -2.79$ ,  $p < .01$ ). Conditional indirect effects show that discomfort matters in the stranger condition (95% CIs: -1.02 to -.21) but not in the friend condition (95% CIs: -.30 to .04). This provides further evidence that discomfort matters less when people are making talking decisions with friends than

strangers.

Finally, further illustration of how interest and discomfort combine to drive conversation can be seen by looking at their relative values across conditions (figure 10). Similar to study 3, interest increases with controversy in both conditions (figure 10a). When talking to strangers, controversy increases discomfort monotonically (2.48 to 4.17 to 4.39, see figure 10b solid line) and thus cancels out the positive effect of interest. When talking to friends, discomfort doesn't increase much, even as topics become highly controversial (see figure 10b dotted line). As a result, the net effect of controversy on conversation is positive.

These results underscore my suggestion that relationship closeness affects the controversy-discussion relationship by affecting the underlying role of discomfort.



**Figure 10: Interesting and Discomfort as a Function of Controversy and Relationship Closeness (Study 4)**

## Discussion

Study 4 provides further evidence for my conceptualization. First, as shown in the prior studies, high controversy does not increase buzz.

Second, the relationship between controversy and likelihood of conversation can

again be understood in light of interest and discomfort. Further, relationship closeness moderates these effects through its impact on discomfort. When talking to friends, the effect of controversy on likelihood of conversation is driven primarily by interest, with discomfort yielding little effect.

Consequently, moderate and high levels of controversy increase likelihood of conversation. When talking to strangers, however, the positive effect of controversy on likelihood of conversation via interest is canceled out by controversy's negative effect via discomfort. Consequently, even moderate levels of controversy fail to increase likelihood of conversation.

#### Additional Studies

One could argue that people are more willing to talk about highly controversial topics with friends (than strangers) because they assume that their friends are more likely to agree with them and will thus reinforce their opinions. For this to drive my results there would need to be a controversy  $\times$  relationship closeness interaction on perceived agreement, where controversy and agreement would be more positively related in the friend condition than in the stranger condition.

This was not the case. In an ancillary study, I asked participants ( $N = 126$ ) to list 3 subtopics that vary in controversy (using the same procedures as Study 3 and 4) and then rate the extent to which either a friend or a stranger would agree with their position on each topic (1 = would not agree at all, 7 = would completely agree). Results show that there was no controversy  $\times$  relationship closeness interaction on agreement ( $F(2, 120) = .93, p > .30$ ).

In another ancillary study, I directly manipulated agreement. I told everyone that

they would be talking with their friends but manipulated whether their friends agreed or disagreed with them and then measured likelihood of discussion for low, middle and high controversy topics. If agreement is driving the effects in the friend condition in Study 4, then i should replicate my observed effect when people believe their friends agree with them but not when they believe their friends disagree. This was also not the case. There was no agreement  $\times$  controversy interaction ( $F < 1.7, p > .2$ ). The main effect of controversy replicates the results of the friend condition in study 4 ( $F(2, 40) = 8.42, p < .01$ ) where moderate controversy increases conversation ( $M_{\text{moderate}} = 5.02$  vs.  $M_{\text{low}} = 3.77, F(1, 49) = 9.14, p < .01$ ) but additional controversy did not further increase conversation ( $M_{\text{high}} = 4.98$  vs.  $M_{\text{moderate}} = 5.02, F < 1$ ). In sum, there is little evidence that agreement drives my results in the friend condition.

## **General Discussion**

Word of mouth has a huge impact on consumer behavior. But less is known about why people talk about some topics more than others. Marketers and consumers believe that controversy increases buzz, for example, but is this actually the case?

A combination of field data and laboratory experiments support my framework and cast doubt on the assumption that controversy always boosts buzz. Data from an online news site (Study 1), as well as lab experiments (Studies 2a and 2b), show that while moderate controversy increases the likelihood of discussion, additional increases in controversy don't provide any additional boost. Additional experiments (Studies 3 and 4) generalize these findings to a broad range of circumstances (e.g., talking to friends or strangers and anonymously or not). Across all studies, highly controversy things were never significantly more likely to be discussed than moderately controversial ones, and in

some cases, even moderate levels of controversy were enough to reduce the likelihood of discussion.

My results also demonstrate the underlying mechanisms behind these effects. Controversial issues are often more interesting, which makes people more likely to talk about them. At the same time, however, controversy can decrease conversation by increasing discomfort. Consequently, how controversy impacts people's decision to talk depends on the confluence of these two factors.

Further, I show that contextual factors such as anonymity and who people are talking to (i.e., friends or strangers) moderate the controversy-conversation link through impacting these component processes (Studies 3 and 4). When social acceptance is less of a concern (e.g., when people are communicating anonymously, Study 3), or less threatened by the discussion of controversial topics (e.g., when communicating with friends, Study 4), the mediating impact of discomfort is reduced. Here, the controversy-conversation relationship tends to be more positive because it is driven primarily by interest.

### **Theoretical Contributions**

This research makes several contributions. First, this paper provides the first empirical analysis of how controversy impacts word of mouth and is one of the first papers to look at controversy in marketing. While consumers and managers hold lay beliefs about controversy, little conceptual or empirical work has actually examined its affects.

Second, while I examined the effects of contextual factors (i.e., anonymity and relationship closeness) to test my framework, I also provide insight into how these factors



shape word of mouth more broadly. Some research has begun to look at how different content factors (e.g., interest or public visibility) influence word of mouth, but less is known about *when* different drivers of word of mouth matter more. This work sheds light on how anonymity and relationship closeness impacts what people share, and suggests this as a fruitful area for further research.

Finally, my research deepens understanding around how complex word of mouth drivers (e.g., controversy) drive conversation. I show that the effects of controversy can be broken down into interest and discomfort, and other complex word of mouth drivers (e.g., brand loyalty) may also be understood via combinations of more basic processes (e.g., arousal, interest, or mood). Future work might examine not only *whether* certain drivers shape word of mouth, but how various basic drivers *combine* to shape discussion.

## **Future Research**

A number of questions deserve future exploration. First, it would be helpful to understand how other person- and situation-specific variables moderate the effects of controversy on conversation. Though self-relevance, general involvement, or how much people care or feel passionate about a topic might all boost word of mouth in general, they might also moderate the impact of controversy on conversation by reducing the negative effects of discomfort. Animal lovers, for example, might be more willing to endure the discomfort of talking about highly controversial topics (e.g., animal testing) because they care so much about the topic.

Broader contextual factors (e.g., norms within social milieu) may also moderate these effects. Controversial topics may be embraced in scientific communities, for example, due to scientists' desire for scientific truth. The response should be less positive

in hostile environments (e.g., being a liberal in a conservative crowd), however, where individuals are especially concerned about how others may respond. Likewise, people may be hesitant to talk about controversial issues when it is difficult to express their entire viewpoint (e.g., Twitter's 140 character limit).

Research might also examine how expectations about future interactions moderate these effects. One possibility is that discomfort is weaker when there is no expectation of future interaction and thus likelihood of discussion goes up with controversy. The same might be true for expectation of a response. One could argue that controversy might increase posting more when people aren't expecting others to reply since the belief that there won't be negative feedback might encourage people to talk about controversial topics. However, the opposite could also occur. Since there is no feedback mechanism, there is no way for the speaker to make sure that her message has been correctly interpreted. Consequently, people might avoid talking about controversies to avoid the miscommunication of identity.

Future work could also examine how controversy affects conversation length or the content of conversations. One might imagine that controversial topics might be less likely to be brought up, but once people start talking about them, the disagreement will sustain a longer conversation. One could also argue that while controversy can generate discussion, much of the word-of-mouth is negative rather than positive. Content analysis of Study 2b, however, is inconsistent with this notion. I used Linguistic Inquiry and Word Count (LIWC, Pennebaker, Francis, and Booth 2001) to measure people's usage of positive and negative emotional words. There was no effect of controversy on the number of positive ( $F(2, 160) = 1.45, p = .24$ ) or negative emotion words ( $F(2, 160) = .69, p =$

.50) that people used. That said, it did appear that people avoided addressing conversation partners directly when discussing moderately and highly controversy topics, as marked by a lower usage of second person pronouns (“you,” “your,” etc.;  $M_{\text{low}} = .71$ ,  $M_{\text{moderate}} = .31$ ,  $M_{\text{high}} = .27$ ,  $F(2, 160) = 2.10$ ,  $p = .13$ ;  $M_{\text{low}} = .71$  vs.  $M_{\text{moderate}} = .31$ ,  $p = .07$ ;  $M_{\text{low}} = .71$  vs.  $M_{\text{high}} = .27$ ,  $p = .06$ ). This may indicate that people actively try to prevent arguments that would otherwise arise from talking about moderately and highly controversial topics by changing communication style.

## Implications

These findings have important implications for managing and leveraging controversy. First, while controversy is not always predictable, the fact that there is strong agreement across people about which topics are more controversial than others (Study 1 and 2b) suggests that companies and organizations can easily get some sense of how controversial a given campaign will be. For example, People for the Ethical Treatment of Animals (PETA) could easily have identified that its “Holocaust on Your Plate” campaign (CNN 2003) would be more controversial than its “I’d Rather Go Naked Than Wear Fur” campaign.

Second, while negative attention can sometimes boost sales (Berger, Sorensen, and Rasmussen 2010), my research suggests that if the goal is to generate word-of-mouth, marketers and politicians should avoid evoking more than a moderate level of controversy. Across my studies, I show that controversy has an inverted-U relationship with conversation, *at best*. In certain circumstances, controversy decrease WOM monotonically.

Finally, the results shows how campaign controversy level can be optimized

based on the desired word-of-mouth channel and audience. To encourage online discussion, for example, marketers may want encourage moderate controversy because people are more comfortable discussing controversial things when they are anonymous. When trying to encourage word of mouth to weaker ties, less controversial campaigns may be more effective.

In conclusion, controversy increases likelihood of discussion, but only in moderate amounts. Its impact is driven by opposing processes of interest and discomfort, which are shaped by contextual factors. By looking at these effects in both the field and the lab, the current paper provides the first look into when, why, and how controversy causes conversation.

## **CHAPTER 3**

### **PERSUASION MOTIVATION AND MEMORY FOR PRODUCT EXPERIENCE**

Word of mouth (WOM) is an increasingly important source of information for potential consumers. Word of mouth significantly affects product performance (e.g., Chevalier and Mayzlin 2006) and firm performance (Liu 2006). While much is known about the financial impact of word of mouth on sales, only recently have researchers begun to examine how engaging in word of mouth affects the information sender. While research has looked at how talking about a product changes the speaker's attitude towards that product (Moore 2012), little is known about how the process of creating word of mouth affects the speaker's memory of their product experience.

Research in psychology has long proposed that talking about an experience can change people's memory of the experience (Bartlett 1932; Loftus 2003). *Verbal overshadowing* (Schooler and Engstler-Schooler, 1990) describes the phenomenon where the verbalizing of a perceptual stimulus impairs subsequent memory of the stimulus. For example, Schooler and colleagues find that those who verbally describe a face have a harder time identifying the face later on than those who do not describe the face (Fallshore and Schooler 1995; Schooler and Engstler-Schooler, 1990).

Importantly, evidence suggests that not all verbalization has similar effects on memory (Ericsson 2002; Meissner and Brigham 2001). (In this paper, the terms verbalization, word of mouth, reviewing, talking, and retelling are used interchangeably.) For example, those who attempt to entertain others during verbalization tend to show worse memory for the initial experience than those who try to be accurate (Dudukovic,

Marsh, and Tversky 2004; Marsh 2007). Although this initial evidence that verbalization mindsets (e.g., to entertain versus be accurate) can intensify or mitigate verbal overshadowing, much more work is needed to understand *which* mindsets affect memory and *why* verbalization mindsets matter.

In the context of consumer word of mouth, consumers are often encouraged to employ a logical mindset when they write product reviews. For example, in eliciting movie reviews (movies.yahoo.com), Yahoo asks reviewers: “Tell us if you liked or disliked the film, but also why you liked or disliked it. Compare this film to others - why is this better or worse?”. In this case, reviewers are not only asked for their opinion, but are asked to provide a rationale for their opinion (e.g., it is better than other movies?). In a similar vein, Amazon encourages reviewers to write logically by asking them to compare and contrast products (e.g., “talk about related products and how this item compares to them.” ([www.amazon.com/gp/community-help/customer-reviews-guidelines](http://www.amazon.com/gp/community-help/customer-reviews-guidelines)). While logical persuasive messages can be influential (Johar and Sirgy 1991; Stafford and Day 1995), an alternative approach to persuasion involves imagery-based appeals (Stafford and Day 1995) (Petrova and Cialdini 2008).

In the current paper, I look at how verbalization of logical- vs. imagery-based word of mouth affects reviewer’s memory. Building on existing work in verbal overshadowing (Schooler 2002; Schooler, Fiore and Brandimonte 1997), which theorizes that memory is impaired when there is a mismatch between encoding and memory retrieval processes, I propose that writing logical reviews impairs memory more than writing imagery-based reviews because the former causes a bigger mismatch between encoding and retrieval memory processes. The detailed rationale is explicated in the next

section and I test my predictions in a series of lab experiments using different product categories. The results show that consumer mindsets during word of mouth transmission can affect their subsequent memory about the products they review.

This work makes several important contributions. First, adding to the growing literature on word of mouth and persuasion, this research shows how verbalization mindsets can affect persuader memory for products. While much research has examined the persuasive power of word of mouth on *receivers* (e.g., Chaiken 1980; Petty and Cacioppo 1986; see Haugtvedt and Kasmer 2008 for a review), little is known about how providing persuasive messages affects the information sender.

This work also provides insights into verbal overshadowing. While the phenomenon of verbal overshadowing is well-documented, it is unclear if these memory impairments are driven by non-veridical verbal accounts (Meissner, Grigham and Kelley 2001) or a general process shift (Schooler 2002). My work contributes to this discourse and provides evidence against the former and in support of the latter.

The current paper also has important implications for practice. Many product categories depend on repeat purchases (Hoyer 1984; Inman and Zeelenberg 2002), and people make repeat purchases based on what they remember from past product experiences. Understanding how talking about a product affects the speaker's memory will help marketers better predict speaker's future repeat purchase behaviors. This work also provides guidance for how to better design online review websites. Although review websites such as Amazon and Yahoo currently elicit logical reviews, this work suggests that seeking imagery-based reviews may better help reviewers preserve their memory for product experiences. (A different on-going project suggests that readers find imagery-

based reviews just as much, if not more, useful than logic-based reviews.) With the gaining popularity of online word of mouth, this research provides direction on how information should be elicited to benefit those who create this valuable information.

In the subsequent sections, I review the phenomenon of verbal overshadowing, discuss how logical and imaginative mindsets may influence the manifestation of verbal overshadowing, present three studies that support my theorizing, and conclude by discussing the contributions and implications of this work.

### **Conceptual Development**

Prior research shows that people's retelling goals can affect their memory of experiences (Dudukovic, Marsh, and Tversky 2004; Tversky and Marsh 2000). For example, accuracy goals during retelling, in comparison to entertaining goals, facilitate subsequent memory performance (Dudukovic, Marsh, and Tversky 2004; Marsh 2007). While work in psychology, especially eyewitness testimony, has explored how retelling affects memory (see Loftus 2003; Roediger and McDermott 1995), little attention has been paid to this issue in marketing. How does communicating logical vs. imagery-based word of mouth (the two common approaches to persuasion) affect people's memory?

### **Verbal Overshadowing**

Verbal overshadowing describes the phenomenon where talking about an experience impairs people's memory for the experience (Schooler and Engstler-Schooler, 1990). For example, those who described a face in detail had a harder time identifying that face later on than those who did not describe the face (Finger and Pezdek 1999). Similarly, people who are asked to describe a color had a harder time identifying the color later on than those who weren't asked to describe it (Schooler and Engstler-



Schooler, 1990). In a different domain, novice wine drinkers (i.e., non-expert) were worse at identifying a wine after they were asked to describe the taste of the wine (Melcher and Schooler 1996).

Importantly, verbal overshadowing has not been observed in domains that are verbal in nature. For example, verbalization does not hurt people's memory for word recognition and statement recognition (Maki & Schuler 1980; Schooler and Engstler-Schooler, 1990) or logical problem solving (Schooler et al. 1993). Taken together, this suggests that verbalization hurts people's performance on tasks that are perceptual in nature (e.g., color perception), but not on tasks that are verbal in nature (Schooler, Fiore and Brandimonte 1997).

Verbal overshadowing has generally been explained via two different theories – one of *recoding interference* and one of *transfer-inappropriate retrieval* (Schooler, Fiore & Brandimonte 1997). Both theories rest upon the notion that knowledge can be represented perceptually and/or verbally (Baddeley 2000; Meissner 2002; Paivio 1990; Schooler and Engstler-Schooler, 1990) and that talking about a perceptual stimulus after initial exposure causes people to hold two different accounts of the same stimulus: one that is perceptual and is derived from the initial stimulus exposure and one that is verbal and results from the articulation of the initial experience.

According to the *recoding interference* account, verbal overshadowing occurs because people tend to generate non-veridical verbal accounts of perceptual experiences. During subsequent recall, people rely on these non-veridical verbal accounts (over the veridical perceptual account), leading to memory impairment (Schooler, Fiore &

Brandimonte 1997). Based on the recoding inference account, there should be a relationship between the quality of verbal accounts and subsequent memory.

Support for the recoding inference account is mixed. In studies where participants are given different verbalization instructions (e.g., *write down everything you remember* vs. *write down only the things you're certain about*), researchers have found a positive relationship between the quality of verbalization and memory performance (Finger & Pezdek 1999; Meissener, Brigham and Kelley 2001). In studies where there is one verbalization condition (and it is compared to a no-verbalization condition), researchers have generally failed to find a relationship between verbalization quality and memory performance (e.g., no significant correlation between verbalization quality and memory performance within the verbalization condition; Finger 2002; Fallshore and Schooler 1995). Given inconsistent support, the recoding interference account has fallen out of favor as researchers have gravitated towards an alternative explanation which proposes that different modes of stimuli processing can be responsible for the effect (Schooler, Fiore & Brandimonte 1997).

According to the *transfer-inappropriate retrieval (TIR)* theory of verbal overshadowing, memory performance is maximized if the same memory processes are activated during encoding and subsequent memory tests (Schooler 2002). Since most experiences are perceptual (with notable exceptions including verbal-specific tasks such as learning a word list) and are thus encoded perceptually, memory for the initial stimulus will be impaired if verbal, rather than perceptual, processes are activated at the time of the memory test. Verbalization is theorized to cause memory impairment by activating

verbal processes (and dampening the activation of perceptual processes; Roediger, Weldon, & Challis, 1989), which spills over to affect subsequent memory tests.

If the TIR account is valid, then activation of perceptual processes or repression of verbal processes after the initial stimulus-exposure should mitigate verbal overshadowing. Several studies provide such evidence. Finger (2002) shows that exposing participants to music after verbalization nullified verbal overshadowing, presumably because auditory exposure activates perceptual processes. Also, exposing participants to perceptual elements of the initial experience (e.g., via presenting a color associated with the underlying stimulus) can also nullify verbal overshadowing effects (Brandimonte, Schooler, and Gabbino 1997; Pelizzon, Brandimonte, and Luccio 2002). A different set of studies show that engaging in articulatory suppression (i.e., rehearsing “lalala”) during initial exposure improves subsequent recall, presumably by preventing engagement of verbal processes (Brandimonte, Hitch and Bishop 1992; Brandimonte & Gerbino 1993).

One especially convincing support for the TIR account of verbal overshadowing shows that asking people to describe one face can hinder their recognition of a different, previously exposed face (Dodson, Johnson, and Schooler 1997). This is difficult to reconcile using the recoding inference account since people were not asked to generate a description of the tested face.

### **Logic-based versus Imagery-Based Word of Mouth and Verbal Overshadowing**

While verbal overshadowing is in general a reliable phenomenon (Meissner and Brigham 2001, p 615), the effect is not always replicated. Verbal elicitation instructions tend to have a significant effect on whether overshadowing occurs (Meissner, Brigham,

and Kelly 2001) and spontaneous verbal expression – ‘think aloud’ procedures where people merely vocalize their “inner speech” (p. 983) – tend not to impact memory performance (Ericsson 2002). Supporters of the recoding interference account have generally used these observations to support of their theory since verbal elicitation instructions (e.g., *write down everything you remember* vs. *write down only the things you’re certain about*) tend to affect the underlying quality of the verbalization, which is then linked to memory performance. However, can these results be explained via the transfer-inappropriate retrieval account of verbal overshadowing?

In this article, I theorize that elicitation instructions affect memory not by changing the content of verbalization (which is a symptom rather than an antecedent of the effect), but by changing the relative activation of verbal vs. perceptual processes during memory test. When people are merely asked to vocalize their thoughts (e.g., think aloud), perceptual and verbal processes are simultaneously activated and neither dominate. However, when verbal elicitation instructions force people to think verbally about a task they would typically approach perceptually (e.g., insight problem solving, Schooler, Ohlsson, and Brooks 1993), verbal processes dominate perceptual processes, impairing memory performance (Ericsson and Simon 1993). This suggests that verbal elicitation instructions that increase activation of verbal (vs. perceptual) processes should lead to greater verbal overshadowing, without affecting the quality of the verbalization.

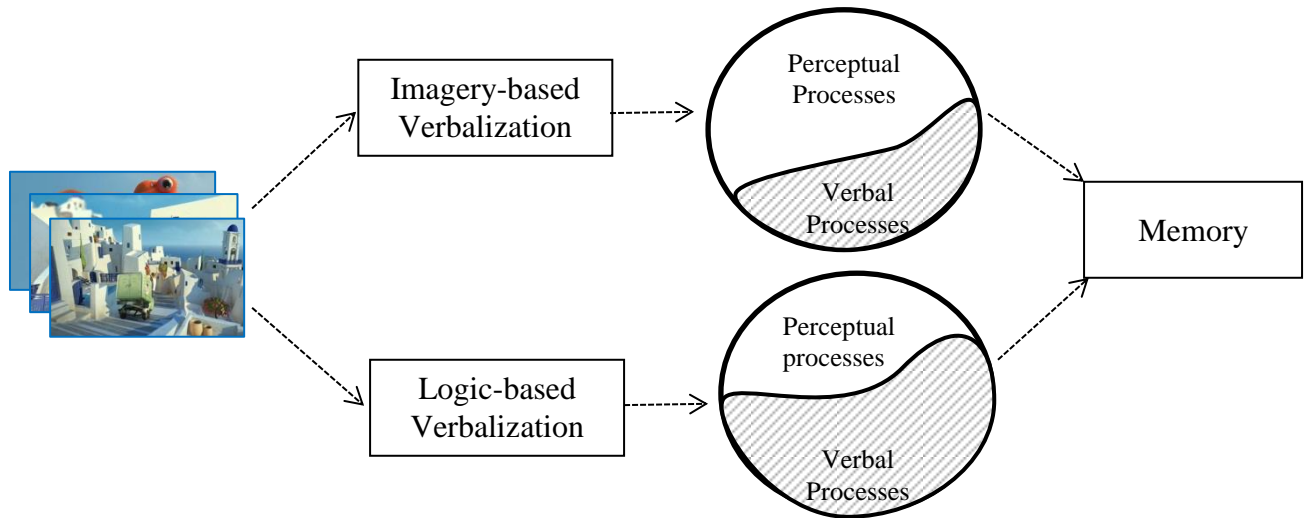
In consumer research, persuasive messages are typically categorized as logic-based appeals (also known as rational or utilitarian appeal) or imagery-based appeals (i.e., experiential, emotion appeals, Stafford and Day 1995). Logic-based appeals contain facts about the product, which can persuade people by changing their cognitions about

the underlying product (Chaiken 1980; Chaiken, Lieberman and Eagly 1989; Petty and Cacioppo 1986). In contrast, imagery-based appeals persuade by asking potential consumers to envision themselves having the described experience (e.g., “Imagine yourself on a sandy beach”; Petrova and Cialdini 2008). Given that logic-based appeals and imagery-based appeals persuade via different processes, it is reasonable to conjecture that consumers who provide logic- versus imagery-based word of mouth will engage different processing systems in their verbalizations.

Dual processing models of cognition generally delineate rational processes from experiential processes (Evans 2008; Epstein 1994). Despite differences in terminology, researchers generally conceptualize one system (System 1) as experiential and primitive and the other as analytical and responsible for higher order thinking (System 2; Stanovich 1999). System 1 has longer evolutionary roots, operates automatically, and is perceptual rather than verbal in nature (Epstein 1994; Evans 2008). System 2 on the other hand is deliberate, analytical, and is responsible for abstract and rule-based thinking as well as verbal processing (Kahneman 2003; Stanovich 1999).

In the context of verbal recall then, it is reasonable to theorize that providing logic-based messages will activate System 2 (vs. System 1) more than providing imagery-based messages. And since System 2 is also responsible for verbal processes, those in the logical condition are likely to have higher activation of verbal processes than those who are asked to transmit imagery-based verbalization. Because the activation of verbal processes impair memory performance (Schooler, Fiore & Brandimonte 1997), those who engage in logical verbalization are likely to show worse memory for the

underlying stimulus than those who engage in imagery-based verbalization. Figure 11 illustrates the theoretical model.



**Figure 11: Relationship Between Verbal Elicitation Method, Process Activation, and Memory**

### **Study 1: Persuasion Method and Recognition Memory**

Study 1 provides the first test of the proposal that logical verbal accounts will lead to worse memory performance than imagery-based accounts. In this first study, participants are shown a short film, prompted for a logic- or imagery-based review of the film, and are then tested on the accuracy of their memory for film facts.

Study 1 also tests an alternative explanation. Past research shows that emotional valence facilitates memory (LeDoux 1992) and one possibility is that the act of writing logical- versus imagery-based reviews differentially affects attitude towards the underlying experience (e.g., positive attitudes becomes more positive under one elicitation condition), which in turn affects memory. To test this possibility, I also measure the valence of attitude towards the film.

## **Experimental Procedure**

Fifty-six students (24 females) for a large public university participated in the study for course credit. The participants were randomly assigned to one of two (logic-based vs. imagery-based verbalization) between-subjects conditions. All participants watched the film “Oktapodi,” a short (2 minute) animation that does not contain any dialogue. After watching the movie, participants were asked to write a recommendation for the film under logic- or imagery-based instructions adapted from McGill and Anand (1989) and Schlosser (2006).

All participants were given the following instructions:

“Please write about this video to a student who will be participating in the study at a later date. Your thoughts about the video will be shared with one other student before he/she watches the video. The other student has not yet seen the video. Thus, you should plan to make a recommendation to him/her. Specifically, would you recommend he/she see the video? Why or why not? Try to be as specific as possible and answer any questions to help him/her form an opinion of the video.”

Then, those in the logic-based condition read:

“When writing your recommendation, you should be careful and well-reasoned in your recommendation. Don't let your imagination get the better of you. Rather, try to make an accurate and logical argument when writing your recommendation regarding the film. Utilize the power of

your rational mind to accurately describe the film when writing your recommendation regarding the film.”

While those in the imagery-based condition read:

“When writing your recommendation, you should rely on your imagination. Don't feel that you have to be coldly analytical in writing your recommendation. Rather, in your mind's eye, try to visualize the film you just watched. Utilize the power of your imagination to vividly describe the film when writing your recommendation regarding the film.”

After participants wrote about the film, they were asked to indicate their attitude towards the film and complete a test of their memory for film facts.

### Memory Test

Participants were presented fourteen statements about the short film and were asked to indicate whether each statement is true or false. Of the fourteen statements, seven were true and seven were false. Memory performance (max 14) is measured as the sum of correct acceptances (i.e., accepting true statements as true) and correct rejections (i.e., rejecting false statements as false). See Appendix A for a detailed listing of the 14 items.



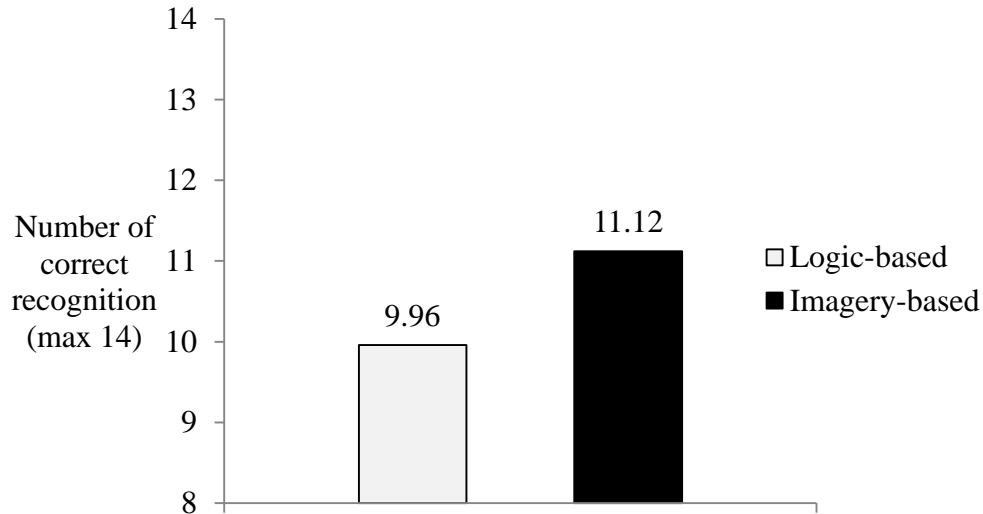
### Attitude Towards the Film

To test the alternative explanation that writing logic- vs. imagery-based recommendation affects people's attitude towards the film (which in turn affects memory), participants reported their attitudes toward the film using five 7-point semantic differential items anchored at -3 and +3: unfavorable/very favorable, bad/good, uninteresting/interesting, dislike/like, irritation/not irritating. Scores were averaged to form a video liking index ( $\alpha = .95$ ). Participants were also asked to rate their own recommendation on a 7-point scale ("What was your recommendation?" 1 = *definitely don't watch the video* to 7 = *definitely watch the video*) as an additional measure of attitude.

### **Results**

Three participants were eliminated from the data analysis because the video did not load or they accidentally skipped over the movie.

Consistent with predictions, those who wrote logic-based recommendations showed worse memory performance than those who wrote imagery-based recommendations ( $M_{\text{logic}} = 9.96$  vs.  $M_{\text{imagery}} = 11.12$ ,  $F(1, 51) = 4.28$ ,  $p = .044$ , see Figure 12).



**Figure 12: Memory as a Function of Persuasion Method (Study 1)**

To examine the possibility that the results are driven by verbal elicitation methods affecting attitude, rather than affecting perceptual vs. verbal process activation, self-reported attitude towards the film and film recommendations were analyzed. Results reveal that most people liked the short movie and that elicitation method did not affect their composite attitude towards the film ( $M_{\text{logic}} = 1.36$  vs.  $M_{\text{imagery}} = 1.18$ ,  $F(1,51) < 1$ ). Recommendations to watch the film were also equally positive across conditions ( $M_{\text{logic}} = 5.25$  vs.  $M_{\text{imagery}} = 5.16$ ,  $F(1, 51) < 1$ ). Text analysis (Pennebaker, Francis, and Booth 2001) of the written reviews reveals that use of positive and negative emotional words was consistent across groups (positive emotional words as a percent of total word count:  $M_{\text{logic}} = 7.11\%$  vs.  $M_{\text{imagery}} = 8.21\%$ ,  $F(1, 51) = 1.06$ ,  $p > .10$ ; negative emotional words:  $M_{\text{logic}} = .94\%$ ,  $M_{\text{imagery}} = .90\%$ ,  $F(1,51) < 1$ ; net positivity (positive emotions – negative emotions):  $M_{\text{logic}} = 6.18\%$  vs.  $M_{\text{imagery}} = 7.30\%$ ,  $F(1, 51) < 1$ ). In sum, there is little evidence that verbal elicitation instructions affected memory by changing attitudes toward the film.

## Discussion

Study 1 provides initial evidence that writing logical verbalizations lead to worse memory performance than writing imagery-based verbalizations. Results also show that this is not due to changes in underlying attitudes towards the short video.

Ancillary analyses, were used to test whether differences in memory are driven by the quality of the verbalization (as proposed by recoding interference hypothesis cite). Using length of verbalization (comprehensiveness) as a measure of verbalization quality (; Wang and Strong 1996), results show no significant differences in word count (i.e., comprehensiveness of the recommendation;  $M_{\text{logic}} = 59.36$  vs.  $M_{\text{imagery}} = 73.60$ ,  $F(1, 51) = 2.17$ ,  $p > .10$ ).

As a further measure of verbalization quality, following Brown and Lloyd-Jones (2002), each review was coded on correctness. Coding was done at the sentence level. A sentence was coded as *correct* if it correctly referred to some element of the movie (e.g., there were two octopi in the video), *incorrect* if it referred to some element of the movie erroneously (e.g., there was dialogue), and *other* if it did not refer to a specific element of the movie (e.g., I recommend the movie; the movie is a waste of time). A net correctness score was calculated for each recommendation following the formula: net correctness =  $(\# \text{ of } \textit{correct} \text{ statements} - \# \text{ of } \textit{incorrect} \text{ statements}) / (\# \text{ of } \textit{correct} \text{ statement} + \# \text{ of } \textit{incorrect} \text{ statements})$ . Of the fifty three participants, sixteen wrote recommendations that did not refer to specific elements of the movie (i.e., only included *other* statements) and they were excluded from correctness analyses (note: exclusion was unaffected by logic vs. imagery manipulation,  $\chi^2(1) = 2.33$ ,  $p > .10$ ). Of the participants who referred to specific elements of the movie, there was no difference in net correctness across

conditions ( $M_{\text{logic}} = 1.00$  vs.  $M_{\text{imagery}} = .97$ ,  $F(1, 35) < 1$ ). The lack of differences on both measures of verbalization quality casts doubt on the recoding interference account and is more consistent with the prediction that elicitation instructions affect memory by shifting processing style.

## **Study 2: Persuasion Method and Memory**

Although Study 1 finds support for the idea that communicating logical verbalization impairs memory, an alternative explanation is that imagery-based verbalization improves memory. To address this question, study 2 includes a verbal priming condition, where participants do not provide verbalization but are primed into a verbal mindset post stimulus exposure. Prior work shows that priming a verbal mindset impairs memory (Dodson, Johnson, and Schooler 1997), and so adding this condition will provide insights into whether logical verbalization impairs memory (in which case those in the logical verbalization and verbal prime conditions should perform similarly on a memory test) or doesn't impair memory (in which case those providing logical verbalization should outperform those in the verbal prime condition) and results are driven by the positive effects of imagery-based verbalization on memory..

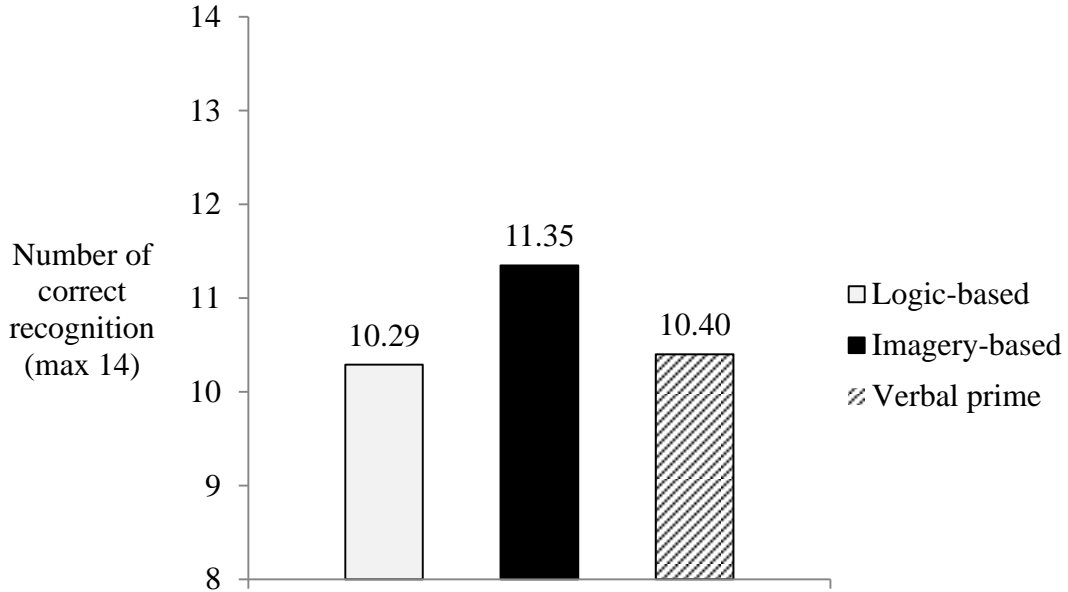
### **Experimental Procedure**

One hundred and nine students (54 females) participated in the study for course credit. They were randomly assigned to one of three between-subject conditions (logic-based verbalization vs. imagery-based verbalization vs. verbal prime). The experimental procedures for those in the logic- and imagery-based verbalization conditions are identical to that of study 1. Those in the verbal prime condition watched "Oktapodi," and were not asked to write a recommendation for the short film. Instead, they were asked to

complete an unrelated verbal task in which they solved anagrams that pretesting showed took the same time as writing a recommendation. Dependent measures were identical to Study 1.

## Results

Two participants were excluded from the analyses because the video did not load correctly. Performance on the memory test was significantly affected by condition ( $F(2, 104) = 3.20, p = .045$ ; see Figure 13). Replicating study 1 results, those in the logical verbalization condition showed worse memory performance than those in the imagery-based verbalization condition ( $M_{logic} = 10.29$  vs.  $M_{imagery} = 11.35, F(1, 104) = 5.38, p = .024$ ). Consistent with the idea that logical verbalization activates greater verbal versus imagery processing, those in the logical verbalization condition performed as poorly as those in the verbal prime condition ( $M_{logic} = 10.29$  vs.  $M_{verbal\ prime} = 10.40, F(1, 104) < 1$ ). Those in the verbal prime condition showed worse memory performance than those in the imagery-based verbalization condition ( $M_{imagery} = 11.35$  vs.  $M_{verbal\ prime} = 10.40, F(1, 104) = 4.41, p = .038$ ).



**Figure 13: Memory as a Function of Verbalization and Priming Conditions (Study 2)**

#### Attitude Towards the Film

Attitude towards the film was unaffected by condition ( $M_{all} = 1.76$ ,  $F(2, 104) = 1.68$ ,  $p > .10$ ). Participants in the two verbalization conditions made similarly positive evaluations of the movie. ( $M_{logic} = 5.74$  vs.  $M_{imagery} = 6.00$ ,  $F(1, 67) < 1$ ). Consistent with study 1, text analysis show that the use of positive and negative emotional words are similar in the two verbalization conditions (positive emotional words:  $M_{logic} = 8.46\%$  vs.  $M_{imagery} = 8.41\%$ ,  $F(1, 67) < 1$ ; negative emotional words:  $M_{logic} = 1.00\%$ ,  $M_{imagery} = .97\%$ ,  $F(1, 67) < 1$ ; net positivity (positive emotions – negative emotions):  $M_{logic} = 7.46\%$  vs.  $M_{imagery} = 7.44\%$ ,  $F(1, 67) < 1$ ).

## Discussion

Study 2 provides further evidence that writing about a product experience logically leads to greater memory impairments than writing about it using imagery. Furthermore, those who wrote about the short film logically showed similar levels of memory impairment as those who were primed into a verbal mindset, which has been documented in the past to cause memory impairments (Dodson, Johnson, and Schooler 1997). It appears then that logical elicitation instructions activate verbal processes (vs. perceptual processes) just as much as more explicit verbal-mindset manipulations (anagrams), thus leading to similar levels of memory impairment.

A similar set of ancillary analyses were conducted to see if results are driven by differences in verbalization quality. The length of the recommendations did not differ significantly across conditions ( $M_{\text{logic}} = 54.86$  vs.  $M_{\text{imagery}} = 70.24$ ,  $F(1, 67) = 2.28$ ,  $p > .10$ ). Verbalization correctness was coded following the same scheme defined in study 1. Of the sixty-nine participants in the verbalization conditions, seventeen did not refer to specific elements of the film and they were excluded from the verbalization correctness analyses (exclusion was unaffected by logic- vs. imagery-based verbalization manipulation,  $\chi^2(1) = .25$ ,  $p > .10$ ). Of the fifty-two participants who referred to specific elements of the film, there was no difference in net correctness ( $M_{\text{logic}} = .94$  vs.  $M_{\text{imagery}} = .94$ ,  $F(1, 50) < 1$ ). These results suggest that results are not driven by differences in verbalization quality.

### Study 3: Persuasion Mindset and Memory for Utilitarian Product

Study 3 is conducted to further test my theory that verbalization under logical mindsets will impair memory more than verbalization under imagery-based mindset. One

may argue that the results of studies 1 and 2 are unique to my movie stimulus, where memory impairment in the logical verbalization condition is driven by the *difficulty* associated with writing a logical recommendation for a short film. If this is the case, then my effects should not hold if people are asked to write a review for a product that is more prone to logical evaluation. To test this alternative explanation, I test participants' memory for a camera in study 3. In comparison to movies, cameras are more utilitarian in nature, which makes them more suitable for logical evaluation. If the alternative explanation holds, then my effect should disappear (i.e., no difference between logical or imagery-based verbalization conditions) or even reverse (i.e., logical verbalization improves memory) since it is less difficult to write about a camera logically.

## **Procedures**

Two hundred and one (122 females) students from a major west coast university participated in the study for course credit. They were randomly assigned to one of two conditions (logic-based verbalization vs. imagery-based verbalization). With the exception of the stimulus and the specific recognition items used, the procedures followed and measures using in study 3 are identical to that of study 1.

In this study, the focal stimulus is a camera. All participants were shown a short video (1 minute and 17 seconds) on the Canon PowerShot camera. In this video, a narrator displays the focal camera points out the different features of the camera (e.g., the camera is a point-and-shoot, the Canon brand is written across the front of the camera). After watching the film, participants were asked to write a logical or imagery-based recommendation of the camera using instructions adapted from study 1 (e.g., *would you recommend this video* was changed to say *would you recommend this camera*, etc.).



### Attitude Towards the Film

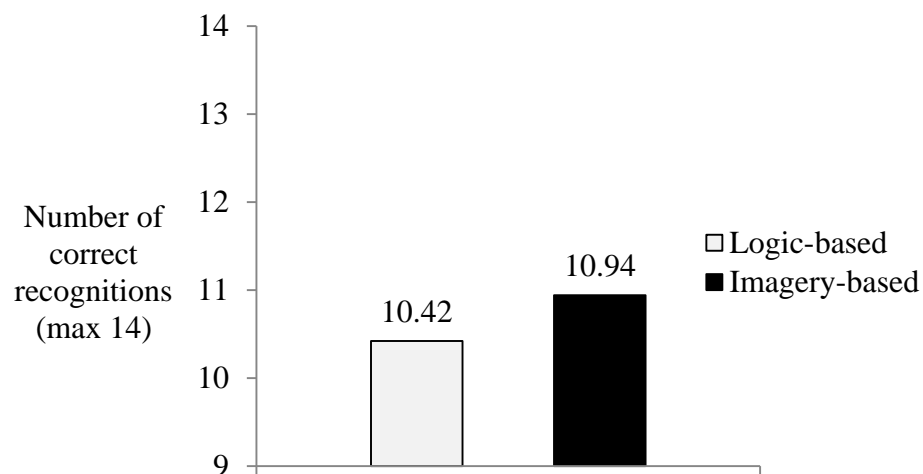
All participants rated the camera using the five items used in study 1. They also indicated their recommendation to buy the camera using the same 7-point scale used in study 1.

### Memory Test

All participants were then presented with fourteen True/False questions about the camera. As before, seven statements were true and seven were false (see Appendix B for full set of items).

### **Results**

Consistent with previous studies, those who wrote logical recommendations showed worse memory performance than those who wrote imagery-based recommendations ( $M_{logic} = 10.42$  vs.  $M_{imagery} = 10.94$ ,  $F(1, 199) = 4.72$ ,  $p = .03$ ; see Figure 14).



**Figure 14: Memory as a Function of Persuasion Method (Study 3)**

### Attitude Towards the Camera

As in Studies 1 and 2, attitude towards the camera was unaffected by logic vs. imagery-based elicitation instructions ( $M_{logic} = 1.30$  vs.  $M_{imagery} = 1.11$ ,  $F(1, 199) = 1.29$ ,  $p > .10$ ). Recommendations were also equally positive across conditions ( $M_{logic} = 3.91$  vs.  $M_{imagery} = 3.96$ ,  $F(1, 199) < 1$ ). Text analyses also reveal no difference in the verbalization sentiment across conditions (positive emotional words:  $M_{logic} = 7.41\%$  vs.  $M_{imagery} = 6.72\%$ ,  $F(1, 199) = 1.06$ ,  $p > .10$ ; negative emotional words:  $M_{logic} = .39\%$ ,  $M_{imagery} = .45\%$ ,  $F(1, 199) < 1$ ; net positivity (positive emotions – negative emotions):  $M_{logic} = 7.03\%$  vs.  $M_{imagery} = 6.27\%$ ,  $F(1, 199) = 1.16$ ,  $p > .10$ ).

### **Discussion**

Study 3 reinforces the results of studies 1 and 2 and shows that elicitation of logical verbalization lead to greater manifestation of verbal overshadowing than elicitation of imagery-based verbalization. By replicating my previous finding using a camera as the focal product, my results undermine the validity of the alternative explanation that these effect results are driven by difficulty associated with writing a certain type of review for a certain product type. Instead, these results are more consistent with my theory that writing logical reviews engages verbal processes (vs. perceptual processes) more so than writing imagery-based review.

I again conducted ancillary analyses to see whether these results can be driven by differences in content of verbalization. First, there is no difference in length of the verbalization ( $M_{logic} = 63.19$  vs.  $M_{imagery} = 60.62$ ,  $F(1, 199) < 1$ ). Of the 201 participants, 105 did not refer to specific elements of the camera and they were excluded from verbalization correctness analyses (note: exclusion this was unaffected by logic vs.

imagery manipulation ( $\chi^2(1) = 1.10, p > .10$ ). Of the 96 participants who made references to specific camera functions, there was no difference in correctness ( $M_{\text{logic}} = .92$  vs.  $M_{\text{imagery}} = .98, F(1, 94) = 2.09, p > .10$ ).

## **General Discussion**

Increasingly, individuals are writing about product experiences and sharing these product experiences with friends and strangers. Despite knowing that sharing may be harmful for consumers' memory (Schooler 2002), little is known about how elicitation instructions can aggravate or mitigate this effect (Marsh 2007).

In three studies, I look at how verbalizing an experience under logic- versus imagery-based mindset can affect consumers' subsequent memory of the product experience. I theorize that transmitting logical verbalization will lead to worse subsequent memory for the original product experience than transmitting imagery-based verbalization and this is likely driven by the former causing greater activation of verbal processes (vs. perceptual processes) than the latter during memory test.

In study 1, I find that those who wrote logical recommendations for the short film "Oktapodi" showed worse memory for the film later on than those who wrote imagery-based recommendation; importantly, there was no difference in quality of the verbal account. These results are replicated and extended in study 2 where I demonstrate that those who wrote logical reviews performed as poorly as those who were explicitly primed into verbal mindset (which has been found in the past to impair memory, Dodson, Johnson, and Schooler 1997). In the final study, I replicate my effect using a different product category (camera), casting doubt on the alternative explanation that my results

are unique to experiential products. Taken together, these studies suggest that not all verbalization are created equal and that elicitation instructions can magnify or nullify verbal overshadowing effects.

## **Contributions**

This paper makes several important contributions. First, this paper contributes to research on persuasion and online word of mouth. While persuasion tends to involve at least two people – a persuader and a target – prior studies tend to focus exclusively on the target. For example, work has looked at how characteristics of people make them more or less susceptible to persuasion (e.g., Petty and Cacioppo 1986). My research in contrast, focuses on the persuader and show that transmitting persuasive messages may impact persuaders' memory of the experience.

This paper also contributes to the verbal overshadowing literature. While verbal shadowing is a reliable phenomenon, there is much debate regarding when and how verbalization hurts memory. This work provides insights into this discussion and offers evidence against a recoding interference account of verbal overshadowing by showing that elicitation instructions can affect people's memory *without* changing the quality of the verbalization. Furthermore, my results are consistent with the transfer-inappropriate retrieval account of verbal overshadowing, which theorizes that verbalization hurt memory by affecting which memory processes are engaged at the time of memory tests (Schooler 2002).

Relatedly, this paper contributes to research on false memory and eyewitness testimony (Loftus 2003). Past research shows that non-accuracy goals (e.g., entertain others) can impair memory performance relative to accuracy goals (Dudukovic, Marsh,

and Tversky 2004). However, little is known about how other verbalization goals – in this case, logic vs. imagery – can affect memory. Understanding how activation of different verbalization mindsets affects memory will enable researchers to not only predict the memory outcome of transmitting different types of verbalizations, but will provide insights into general memory processes.

### **Limitations and Future Research**

While the current work provide initial evidence that verbal elicitation instructions can affect memory performance by influencing the relative activation of perceptual versus verbal processes, more work is needed to further document these underlying processes. For example, if elicitation instructions indeed affect the relative activation of these processes, then elicitation instructions should affect how people approach tasks in general, even on ones unrelated to the underlying stimuli. One prediction, for example, could be that after writing logic- or imagery-based reviews, those in the logical condition would be quicker at processing verbally-based product information (e.g., list of product functions) than perceptual information (e.g., product functions pointed out visually) and that the opposite would be true for those who wrote imagery-based reviews.

Furthermore, while the current work shows that those who transmit imagery-based word of mouth will have better memory for the initial product experience than those who transmit logic-based word of mouth, it is unclear how these processes compare to non-verbalization conditions. And so additional work is needed to understand 1) the overall impact of any review-writing on consumers' memory and 2) the extent to which different verbal elicitation instructions can help consumers preserve their memory.

## Implications

More and more are people talking about product and experiences online and my paper has clear implications for design of online recommendation systems.

Most product websites currently encourage consumers to write logic-based recommendations (e.g., by asking them to compare reviewed product to other products, as in the case of Yahoo and Amazon). However, I show that in comparison to imagery-based recommendations, logic-based recommendations impair reviewer's memory of their actual product experience. One recommendation then is for product review websites to elicit imagery-based reviews rather than logic-based reviews in order to help reviewers better preserve their memory. (In a separate study, I find preliminary evidence that consumers find reviews written under imagery mindsets just as much, if not more, valuable than reviews written under logical mindsets). This is particularly important for product categories that depend on repeat purchase, whereby people's decision to make repeat purchase *and* their evaluation of their repeat purchase experience is likely dependent on their memory for the initial consumption experience.

This work also has implication for how information should be elicited from witnesses in legal trials. Witnesses are instructed to "tell the truth" on the witness stand and practically speaking, one can argue that witnesses tend to provide testimonies in a logical mindset because they know that if they provide information that seems illogical, their credibility and willingness to provide "truthful" information will be called into question. If this is the case, then de-biasing elicitations (e.g., please visualize the experience when recalling what happened) should be used to help witnesses better

preserve their memory in the likely case that they are asked to recall their memory in the future.

Talking is a fundamental part of people's everyday life and people share over 88% of their emotional experiences (Rimé, Finkenauer, Luminet, Zech, and Philippot 1998). While much work has sought to document people's sharing behavior (Rimé et al. 1998) and how verbalization affects people's wellbeing (Pennebaker 1997), more work is needed to understand how and why sharing affects memory. Given that our memory makes up who we are and directs our future behavior, understanding how talking affects our memory will enable us to better understand how we evolve and change as a function of sharing experiences with others.

## **CHAPTER 4**

### **TEMPORAL CONTIGUITY AND NEGATIVITY BIAS IN THE IMPACT OF ONLINE WORD-OF-MOUTH**

Online product reviews are an important information source for consumers (Chevalier and Mayzlin 2006). Word-of-mouth (WOM) communication is highly trusted by online shoppers (Nielsen 2009) and over sixty percent of consumers consult online reviews before making buying decisions (Razorfish 2008). Practitioners are interested in WOM communication because it affects, among other things, consumers' willingness to pay for products (Ba and Pavlou 2002b; Houser and Wooders 2006) and product sales (Chevalier and Mayzlin 2006; Godes and Mayzlin 2004; Liu 2006).

However, not all word-of-mouth has similar effects on consumer behavior. While positive reviews are more prevalent (Fowler and De Avila 2009), they have a smaller impact than negative reviews on product sales (Basuroy, Chatterjee, and Ravid 2003; Chevalier and Mayzlin 2006) and product evaluations (Herr, Kardes, and Kim 1991; Mizerski 1982). Although the negativity bias (i.e., the discounting of positive information) is well documented (Baumeister et al. 2001; Rozin and Royzman 2001), there is limited study of its moderators. In particular, little attention has been paid to factors that reduce the negativity bias.

This article shows that the presence of words and phrases indicating temporal proximity between product consumption and review-writing, which I refer to as temporal contiguity cues, mitigates the negativity bias by increasing the perceived value (i.e., perceptions of the helpfulness of information provided by others for learning or making a decision; Weiss, Lurie, and MacInnis 2008) of positive reviews. Building on the ideas



that information receivers 1) make attributions about WOM communication (Grice 1975), 2) use these attributions to assess the value of provided information (Friestad and Wright 1994), and 3) may have more reasons to attribute positive (vs. negative) WOM to factors other than the product experience (Mizerski 1982), I propose that the presence of temporal contiguity cues may mitigate the negativity bias by reducing the extent to which consumers attribute positive WOM to the reviewer versus the product experience.

I theorize that, in the absence of temporal contiguity cues, attributions of reviews to the reviewer (vs. product experience) are stronger for positive than negative reviews. One possible explanation is that people may have more personal reasons to talk about positive than negative product experiences. For example, a positive review might be written to make the reviewer feel good about her choices or to signal competence to others. If review readers share these inferences, this would lead to a negativity bias since reviews become less valuable as they become less attributed to the underlying product and more attributed to alternative causes (Mizerski 1982).

In the same way that temporal contiguity leads to inferences of causality for physical events (i.e., between the actions of objects; Michotte 1963; Shanks, Pearson, and Dickinson 1989), cues indicating temporal contiguity between the product experience and review-writing should strengthen reader attributions that the product experience is the proximate cause of the review. However, this effect should be stronger for positive than for negative reviews since there may be few reasons other than the product experience itself to communicate negative information (Mizerski 1982). In other words, the presence of temporal contiguity cues may mitigate the negativity bias by changing reader beliefs about the cause of positive information.

This article makes a number of contributions. First, I contribute to research on the negativity bias by identifying an important and previously unexplored moderator. Specifically, I find evidence that temporal contiguity cues mitigate the negativity bias, even in an environment where negative information is less frequent and thus potentially more diagnostic (Skowronski and Carlston 1989). In addition to providing results inconsistent with a frequency account of the negativity bias, my results are also at odds with related accounts proposing that positive information is less attributed to the underlying stimulus because social norms increase the prevalence of positive information (e.g., Mizerski 1982). Instead, my findings suggest that the negativity bias in WOM is driven by differences in the perceived strength of the connection between product experiences and the reporting of these experiences.

Second, my work contributes to research on causal judgment. Although the role of temporal contiguity in facilitating perceptions of *physical* causality is well-explored (Michotte 1963; White 1988), its study in the social psychological domain is limited (Buehner and May 2003). This article extends the concept of temporal contiguity to the social domain by showing that people rely on temporal contiguity when judging information provided by others.

Third, this research offers insights to managers who are concerned about the excessive impact of negative reviews (Miller 2009). Although many studies have documented the implications of online WOM (Godes and Mayzlin 2004; Tirunillai and Tellis 2012), only recently has research begun to look at the psychological processes underlying the creation and evaluation of WOM (Berger and Schwartz 2011; Cheema and

Kaikati 2010; Wojnicki and Godes 2013). This research helps marketers take actions that augment the value of positive information.

### **The Negativity Bias**

The negativity bias refers to the phenomenon where people value positive information less than negative information (Baumeister et al. 2001; Rozin and Royzman 2001). The negativity bias has been found in numerous settings. For instance, relative to negative traits, positive traits are less heavily weighted in person perception (Fiske 1980), positive product attributes are perceived as less diagnostic of product quality (Herr, Kardes, and Kim 1991; Mizerski 1982; Wright 1974), and positive reviews have a weaker effect on purchase decisions (Basuroy, Chatterjee, and Ravid 2003; Chevalier and Mayzlin 2006).

There are evolutionary, frequency-as-information, and attribution-based frequency accounts for the negativity bias. Evolutionarily speaking, individuals are more likely to survive and thrive if they pay careful attention to negative information since negative events are more consequential than positive ones (Baumeister et al. 2001; Rozin and Royzman 2001; Taylor 1991). From a frequency-as-information perspective, negative information is more informative since it is rarer and indicates a change from more frequently experienced positive states (Fiske 1980; Peeters and Czapinski 1990). The frequency account is supported by research showing a positivity bias in environments where positive information is rarer (Rozin and Royzman 2001; Skowronski and Carlston 1989). The frequency-as-information account might explain the negativity bias in online WOM since online positive reviews outnumber negative reviews eight-to-

one (Decker 2006; Greenleigh 2011); yet, positive reviews are less influential (Basuroy, Chatterjee, and Ravid 2003; Chevalier and Mayzlin 2006).

A related explanation for the negativity bias comes from frequency-based attribution accounts. These accounts propose that positive information is less attributed to the underlying stimulus, and therefore less influential, because social norms make positive information more frequent. Specifically, social norms lead people to provide positive information about products (Kanouse and Hanson 1971; Mizerski 1982). Because of this, negative information is rarer; this relative rarity increases its influence (Jones, Gergen, and Jones 1963; Mizerski 1982; Thibaut and Riecken 1955). In contrast, I propose that consumer attributions about positive versus negative information are based on their naïve theories about the sources of such information.

### **Review Valence and Attributions**

Past research shows that consumers make inferences about why product information is shared and use these inferences to judge the value of this information (Friestad and Wright 1994). When evaluating persuasive communication, consumers assess the extent to which the communication is due to personal versus situational causes (Folkes 1988). For example, a positive restaurant review could be attributed to the reviewer's tendency to be positive in general (Mizerski 1982) or to the food and service being genuinely good. WOM that is more attributed to the underlying product experience than to the information provider is more persuasive. One possible explanation for the negativity bias is that positive reviews are more attributed to the reviewer (vs. product experience) than negative reviews because there may be more personal reasons (e.g., the

reviewer's motivation, traits, moods, attitudes, and anything else that resides within them; Gilbert and Malone 1995) for the reviewer to engage in positive WOM.

For instance, people may communicate positive information in order to look good to themselves or others. Product purchases are mostly discretionary and consumers are largely responsible for their own consumption outcomes. Because people have control over which products to buy, positive information about product choices signals competence while negative information signals ineptitude (Angelis et al. 2012; Wojnicki and Godes 2013).<sup>1</sup> Similarly, since receivers associate the content of the message with the messenger (Kamins, Folkes, and Perner 1997; Manis, Cornell, and Moore 1974), information providers prefer to be the courier of good news than the bearer of bad news (Bond and Anderson 1987; Manis, Cornell, and Moore 1974; Tesser and Rosen 1975). Further, adherence to social norms of positivity may encourage reviewers to provide more positive information (Mizerski 1982; Rozin and Royzman 2001) and striving to achieve or maintain positive mood may lead reviewers to reflect on positive events (Isen, Nygren, and Ashby 1988; Isen and Patrick 1983).

In summary, one possible explanation for the negativity bias is that consumers may have more personal reasons to provide positive than negative WOM and are likely to assume that others behave with the same insights and knowledge (Epley et al. 2004; Nickerson 1999). As a result, positive WOM is more attributed to the reviewer (vs.

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<sup>1</sup> Under certain circumstances, negative evaluators are judged to be more intelligent and discriminating (Amabile and Glazebrook 1982; Schlosser 2005). But, there is little empirical evidence that people *think* that others engage in negative WOM to self-enhance. In a pilot study, I asked people whether they think others would post positive or negative reviews to make themselves look good and whether they would post positive or negative reviews to make themselves look good. Respondents overwhelmingly indicated they (18 out of 20) expected others to post positive reviews to self-enhance and that they (19 out of 20) would post positive (rather than negative) reviews to make themselves look good to others.

product experience) than negative WOM. Because WOM decreases in value as it becomes relatively more attributed to non-product causes (Mizerski 1982), this should lead to a negativity bias. However, factors that decrease attributions of positive reviews to the reviewer, or increase attributions to the product experience, should attenuate this negativity bias. I propose that the presence of temporal contiguity cues is one such factor.

### **Temporal Contiguity and Causal Attributions**

Temporal contiguity, the degree to which events are close to each other in time, is *the* dominant perceptual cue used by humans to establish causality between physical events (Bullock, Gelman, and Baillargeon 1982; Einhorn and Hogarth 1986; Heider and Simmel 1944; Kummer 1995; Michotte 1963). In the absence of temporal contiguity, perception of causality is greatly impaired (Buehner and May 2003; Einhorn and Hogarth 1986; Michotte 1963; Shanks, Pearson, and Dickinson 1989).

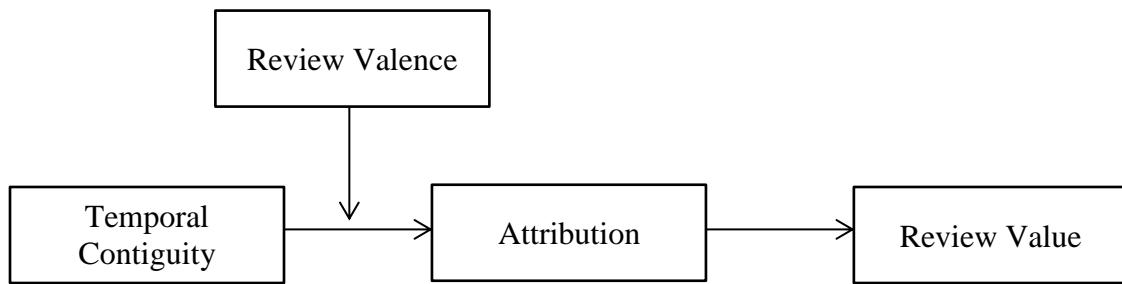
Although studies of temporal contiguity have concentrated on causal attributions for physical events, social attribution research has hypothesized—but, to my knowledge, not empirically tested—the idea that temporal contiguity matters when making causal inferences about human behavior. For example, Kelley’s (1973) covariation model of attribution rests on the assumption that “a close temporal relation [is] essential to a causal interpretation” and that “effects are ordinarily assumed to occur closely after their causes” (p. 109). The idea that temporal contiguity is used to make attributions about others’ actions is also consistent with research suggesting that the development of causal knowledge, and the processing of causal information, is carried out by a single general system (Anderson 1995; Siegler 1991; Sperber, Premack, and Premack 1995). In the case of an online review, this suggests that causal knowledge about temporal contiguity gained

in the physical domain will be used to make attributions about the proximate cause of the review; in particular, the presence of temporal contiguity cues will causally connect the product experience to the review, facilitating perceptions that the review is driven by the product experience rather than the reviewer. If positive reviews are more likely than negative reviews to be attributed to the reviewer, the effect of temporal contiguity on increasing attributions of reviews to the product experience (vs. reviewer) and increasing review value should be stronger for positive than negative reviews.

This discussion suggests the following set of testable hypotheses:

- H1: The presence of temporal contiguity cues increases the perceived value of positive reviews to a greater extent than negative reviews;
- H2: In the absence of temporal contiguity cues, positive reviews are more attributed to the reviewer (vs. product experience) than negative reviews;
- H3: The presence of temporal contiguity cues increases attributions of reviews to the product experience (vs. reviewer) to a greater extent for positive than negative reviews.

Figure 15 summarizes the theoretical model. Five studies examine the hypotheses and the proposed attribution mechanism. Studies 1 and 2a use reviews from Yelp.com and an experiment to investigate whether the presence of temporal contiguity cues increases the perceived value of positive reviews to a greater extent than negative reviews. Studies 2b and 3 test the proposed mechanism through which temporal contiguity affects review value. Study 4 examines whether the effects of temporal contiguity extend to choice.



**Figure 15: Relationship Between Valence, Attribution, Value, and Temporal Contiguity**

### **Study 1: Temporal Contiguity Cues in the Field**

Study 1 examines the influence of temporal contiguity cues on the perceived value of positive versus negative Yelp restaurant reviews. This data source was chosen for two reasons. First, Yelp is one of the most popular service review sites on the web. With over 50 million unique users (Kincaid 2011), Yelp is touted as one of the most social product review websites (Wang 2010). Yelp reviewers must register and create a profile that includes their location, name, hobbies, and interesting things about them such as “Things I Love,” “My Favorite Movie,” and “My Last Meal on Earth.” Reviewers have the option of uploading a photo to their profile and roughly 90% of the reviews in my sample are accompanied by a profile photo. Yelp encourages social interactions by allowing reviewers to become “Friends” with one another and send compliments to one another with titles such as “You’re Cool” and “Hot Stuff.” Second, consumer interest in restaurant reviews, and merchant concerns about negative restaurant reviews, are high (Keller and Fay 2006; Miller 2009). And so, Yelp restaurant reviews offer a rich and important setting for examining the effects of temporal contiguity on the value of positive and negative online WOM.



## **Data**

Over 65,000 reviews for the 19 or 20 most popular restaurants (in terms of number of reviews written) in five major cities (Atlanta, Chicago, Los Angeles, San Francisco, New York; 98 restaurants total) were extracted from Yelp. The data consist of all available reviews for those restaurants as of June 17, 2010. Reviews from different cities were chosen to enhance generalizability. Reviews from the most reviewed restaurants in each city were chosen because they tend to foster high levels of reader and reviewer involvement. For each review, I extracted the star rating (on a 5-point scale where 5 is best), restaurant name, review text, review date, and the number of people finding the review useful. I also extracted the number of friends the reviewer had on Yelp, the number of reviews they had posted, whether or not they provided a profile photo, and whether or not they were a “Yelp Elite.” The characteristics of Yelp Elite reviewers are described under reviewer-specific controls. Appendix C shows a sample review illustrating the variables that I extracted.

## **Dependent Measure**

Value was operationalized as the number of “useful” votes a review received.

## **Independent Measures**

### Review Valence

Review valence was proxied by the star rating (on a scale of 1-5, with 5 indicating a very positive experience) that accompanies the text of each review. The average review in my sample is positive (mean = 3.98 out of 5 stars); 10% of the reviews are negative (1 or 2 stars), 15% are neutral (3 stars), and 74% are positive (4 or 5 stars). The distribution

of ratings in my sample is comparable to the distribution of star ratings across Yelp as a whole (Yelp 2009), suggesting that my dataset is representative of Yelp reviews in general. The disproportionate number of positive reviews in my sample is also consistent with what researchers have found in other online platforms (Fowler and De Avila 2009).

### Temporal Cues

I identified two types of temporal cues. *Temporal contiguity cues* are words or phrases indicating that the review was written on the day of product consumption (e.g., “today,” or “just got back”). This binary variable was set to 1 when a review contained such cues and 0 otherwise. To rule out the possibility that my results are driven by the presence of any temporal information in general, I created another variable called *other temporal cues* that was coded as 1 if a review contained temporal information not captured by *temporal contiguity cues* (e.g., “last week,” “Tuesday”) and 0 otherwise. Reviews with both types of temporal cues were categorized as temporally contiguous reviews.

Given the large number of reviews, hand coding of all temporal cues was infeasible. I read three hundred reviews and coded for the presence of *temporal contiguity cues* and *other temporal cues*. Words and phrases used in temporal coding were extracted and put into a text library (see Appendix D). I automated the coding process by using a computer program that checked reviews for library keywords. Using a separate sample of 500 hand-coded reviews, I found that the computer program correctly categorized over 90% of reviews (inter-coder reliability between machine and author coding was high: Cohen’s  $\kappa > .95$ ; Cohen 1960; Elliott and Woodward 2007).

Of the 65,531 reviews, 54,880 did not contain any temporal information. Of the remaining reviews, 2,448 contained *temporal contiguity cues*, and 8,203 contained only *other temporal cues*. It is important to note that the distribution of negative (star rating = 1 or 2), neutral (star rating = 3), and positive (star rating = 4 or 5) reviews was not significantly different in reviews written with temporal contiguity cues versus reviews written without these cues ( $\chi^2(1) = 1.46, p = .49$ ; see Table 1). This reduces the possibility that the effects of temporal contiguity cues are driven by differences in their relative frequency in positive versus negative reviews.

### **Control Variables**

To isolate the effects of review valence and the presence of temporal contiguity cues, we controlled for review- and reviewer-specific variables as well as restaurant-specific fixed effects.

#### Review-Specific Controls

Review-specific controls were review age, calculated as the number of days between review posting and data collection (June 17, 2010), and review length. The average review in my sample is 142 words and reviews written with temporal contiguity cues or other temporal cues are substantially longer (208 and 213 words, respectively).

#### Reviewer-Specific Controls

Reviewer-specific controls were the number of friends the reviewer has on Yelp, the number of reviews posted by the reviewer (log transformed to control for positive skew), whether or not the reviewer has a profile photo (1 = has photo, 0 otherwise), and whether or not the reviewer is a Yelp Elite member (1 = Yelp Elite, 0 otherwise; see

Table 1 for descriptive statistics). Yelp Elite are a subset of reviewers identified by Yelp based on an application process in which reviewers must show they are both passionate and knowledgeable about the businesses they review. Though imperfect, the number of reviews posted by the reviewer and their Yelp Elite status are likely to be indicators of reviewer expertise and review quality.

To examine the possibility that temporal contiguity cues are used to a greater extent by those who write more reviews, and that my hypothesized effects are driven by differences in writers rather than by temporal contiguity cues, I used a median split to divide our data into two equal groups based on the number of reviews posted. I found that those with more reviews were responsible for 52% of the reviews with temporal contiguity cues and those with fewer reviews were responsible for 48% of the reviews with temporal contiguity cues. Similarly, the roughly 27% of the people in my sample who are Yelp Elites were responsible for 30% of the reviews with temporal contiguity cues. This limits the likelihood that my results are due to differences in reviewer expertise and ability.

### Restaurant-Specific Effects

I controlled for restaurant-specific fixed effects by creating 98 restaurant dummies.

### **Specification**

Most reviews in my sample received few useful votes while a small number received a large number of useful votes. Given that my dependent variable *value* is a count variable where its variance exceeds its mean (mean = 1.13, variance = 6.37, over-

dispersion = 2.06), I modeled review value using a negative binomial regression with robust standard errors (Greene 2008b)

$$\begin{aligned}
 \text{Value}_{ijk} = & \exp(\alpha_0 + \beta_1(\text{positive}_j) + \beta_2(\text{negative}_j) + \beta_3(\text{temporal contiguity cues}_j) + \\
 & \beta_4(\text{other temporal cues}_j) + \beta_5(\text{positive}_j \times \text{temporal contiguity cues}_j) \\
 (1) \quad & + \beta_6(\text{negative}_j \times \text{temporal contiguity cues}_j) + \beta_7(\text{positive}_j \times \text{other temporal cues}_j) + \\
 & \beta_8(\text{negative}_j \times \text{other temporal cues}_j) + \Omega'X_{ij} + \alpha_k + \varepsilon_{ijk})
 \end{aligned}$$

where  $j$  indexes the review,  $i$  indexes the reviewer,  $k$  indexes the restaurant,  $X_{ij}$  is the vector of review- and reviewer-specific controls,  $\alpha_k$  represents restaurant dummies, and  $\varepsilon_{ijk}$  is the idiosyncratic error.

To directly test the hypothesis that temporal contiguity cues increase the value of positive reviews more than negative ones (H1), I created indicator variables for positive reviews ( $\text{positive}_j = 1$  if star rating = 4 or 5, 0 otherwise) and negative reviews ( $\text{negative}_j = 1$  if star rating = 1 or 2, 0 otherwise), and tested whether the presence of *temporal contiguity cues* <sub>$j$</sub>  had a stronger positive interaction with positive than with negative reviews (i.e.,  $\beta_5 > \beta_6$ ). Neutral reviews (star rating = 3) made up the baseline model and coefficients can be directly interpreted with respect to neutral reviews (e.g., a significant positive  $\beta_2$  means that negative reviews are more useful than neutral ones). To test my hypotheses, I rely on the Wald test (Greene 2008b).

To examine the possibility that any sort of temporal information, rather than temporal contiguity cues alone, increases the value of positive reviews more than negative ones, I tested whether *other temporal cues* <sub>$j$</sub>  interacted with *positive* <sub>$j$</sub>  ( $\beta_7$ ) and *negative* <sub>$j$</sub>  ( $\beta_8$ ) reviews to affect review value.

## Results

Descriptive statistics are displayed in Table 1. Results for the empirical models are presented in Table 2.

**Table 1: Yelp Data Descriptive Statistics (Study 1)**

	<i>Total</i>	<i>With Temporal Contiguity Cues</i>	<i>With Other Temporal Cues</i>	<i>With No Temporal Cues</i>
N	65,531	2,448	8,203	54,880
# Useful	1.13	1.70	1.44	1.06
Valence (1-5 stars)	3.98	3.94	3.94	3.99
Review Age (days)	391	359	386	394
Word Count	142	208	213	128
# Reviews	111	128	121	109
# Friends	53	72	67	50
Photo (1 = w/photo)	.89	.90	.90	.88
Elite (1 = Yelp Elite)	.27	.33	.33	.26

**Table 2: Perceived Value of Yelp Reviews as a Function of Review Valence and Presence of Temporal Contiguity Cues (Study 1)**

<i>Variables</i>	(1) Discrete Model		(2) Continuous Model	
	<i>Coefficient</i>	<i>(SE)</i>	<i>Coefficient</i>	<i>(SE)</i>
Temporal contiguity cues	-.06	(.07)	-.09	(.14)
Other temporal cues	-.02	(.04)	-.09	(.08)
Negative	.52**	(.03)		
Positive	.03	(.02)		
Positive × temporal contiguity cues	.18*	(.08)		
Negative × temporal contiguity cues	-.08	(.12)		
Positive × other temporal cues	-.05	(.04)		
Negative × other temporal cues	-.15*	(.07)		
Stars			-.11**	(.01)
Stars × temporal contiguity cues			.10**	(.03)
Stars × other temporal cues			.03	(.02)
<i>Controls</i>				
Review age	<.01**	(<.01)	<.01**	(<.01)
Friends	<.01**	(<.01)	<.01**	(<.01)
Log(reviews)	.17**	(.01)	.16**	(.01)
Photo (1 = present, 0 = not present)	.72**	(.03)	.71**	(.03)
Elite status (1 = elite, 0=not elite)	.32**	(.02)	.32**	(<.01)
Word count	<.01**	(<.01)	<.01**	(<.01)
N = 65,531				
Pseudo R <sup>2</sup>		.13		.13

\*Significant at 5% level, \*\*Significant at 1% level, robust standard errors in parentheses.

In the absence of temporal contiguity cues, negative reviews were more valuable than neutral reviews ( $\beta_2 = .52, p < .01$ ) whereas positive ones were not significantly more valuable than neutral reviews ( $\beta_1 = .03, p > .10$ ). Consistent with the negativity bias, a Wald test shows that negative reviews were more valuable than positive ones ( $H_0: \beta_1 = \beta_2, \chi^2(1) = 513.55, p < .001$ ).

Supporting H1, the presence of temporal contiguity cues increased the value of positive reviews ( $\beta_5 = .18, p < .05$ ) but not negative reviews ( $\beta_6 = -.08, p > .10$ ). A Wald test confirms that temporal contiguity cues increased the value of positive reviews to a greater extent than negative ones ( $H_0: \beta_5 = \beta_6, \chi^2(1) = 6.01, p = .01$ ). The presence of other temporal cues did not increase the value of positive reviews ( $\beta_7 = -.05, p > .10$ ), and actually decreased the value of negative reviews ( $\beta_8 = -.15, p < .05$ ), perhaps because this information interferes with the interpretation of negative ratings (Schlosser 2011). In other words, although knowing that a review is written on the day of consumption significantly increased the perceived value of a positive review, other temporal information about the reviewer's experience (e.g., crowded on Tuesdays) did not. The main effects of temporal contiguity cues and other temporal cues were both insignificant.

Consistent results are obtained when review valence is modeled as a continuous variable using the 1-5 star rating; more formally:

$$\text{Value}_{ijk} = \exp(\alpha_0 + \beta_1(\text{review valence}_j) + \beta_2(\text{temporal contiguity cues}_j) + \beta_3(\text{other temporal cues}_j) + \beta_4(\text{review valence}_j \times \text{temporal contiguity cues}_j) + \beta_5(\text{review valence}_j \times \text{other temporal cues}_j) + \Omega'X_{ij} + \alpha_k + \varepsilon_{ijk}). \quad (2)$$

As with the earlier analysis, results show that as reviews become more positive, they become less valuable ( $\beta_1 = -.11, p < .01$ ). However, this negative relationship is mitigated

in reviews written with temporal contiguity cues as indicated by a significant positive interaction between temporal contiguity cues and review valence ( $\beta_4 = .10, p < .01$ ). A Wald test reveals a lack of relationship between value and review valence in reviews written with temporal contiguity cues ( $H_0: \beta_1 + \beta_4 = 0, \chi^2(1) = .04, p = .83$ ). In other words, there is no evidence of negativity bias in reviews containing temporal contiguity cues. Consistent with the discrete model, treating valence as a continuous variable shows that the presence of temporal contiguity cues, but not other temporal cues, mitigates the negativity bias by increasing the value of positive reviews. The main effects of temporal contiguity cues and other temporal cues are insignificant.

According to my theory, an increase in the time noted between consumption and review-writing should reduce the value of positive reviews. To test this, I created a variable to capture the number of days between consumption and review-writing for reviews that referenced when consumption occurred. This variable was coded as 0 if the review contained temporal contiguity cues (e.g., “today,” “just got back”;  $N = 2448$ ), 1 if the review contained “yesterday” ( $N = 1546$ ) or “last night” ( $N = 1072$ ), 5 if the review contained “last weekend” ( $N = 274$ ; since Thursday, the midpoint of a Monday to Sunday week, is roughly 5 days after the previous weekend), and 7 if the review contained “last week” ( $N = 133$ ). Reviews with a long delay (i.e., “last month,” “last year”) were not included since they are outliers that may significantly affect the substantive results (Belsley, Kuh, and Welsch 1980). As predicted, the value of positive reviews decreased as temporal delay increased ( $\beta_{\text{positive delay}} = -.04, SE = .009, z = -4.90, p < .001$ ). The value of negative reviews was unaffected by temporal delay ( $\beta_{\text{negative delay}} = -.07, SE = .11, z = -.65, p > .5$ ).



## Discussion

The analysis of Yelp restaurant reviews shows that temporal contiguity cues increase the value of positive reviews and attenuate the negativity bias. In the absence of cues to temporal contiguity, negative reviews are perceived as more valuable than positive ones. However, in reviews written with temporal contiguity cues, this difference in valuation is no longer observed.

The Yelp dataset, drawing on more than 65,000 reviews from five major cities, is appealing from an external validity standpoint. However, although I controlled for a range of factors that may affect review value, there is a possibility that my findings are driven by unobserved variables or selection issues. For example, it could be that consumers who read negative reviews are different from those who read positive reviews and that these two groups of consumers are differentially affected by temporal contiguity cues. Also, the secondary data do not allow me to examine the proposed attribution account for the negativity bias and its mitigation by temporal contiguity. Specifically, I was not able to test whether positive reviews are relatively more attributed to the reviewer than negative ones and that the presence of temporal contiguity cues affects these relative attributions. Finally, it is not clear whether these effects carry over to purchase intentions.

To address these issues, I conducted four lab studies. In the first two lab studies, I test whether temporal contiguity and valence interact to affect review value (Study 2a) and attributions (Study 2b). I examine review value and review attributions separately to avoid measurement effects (Feldman and Lynch 1988). In the third lab study (Study 3), I

measure both value and attributions to test for mediation. In a final lab study (Study 4), I examine how temporal contiguity affects choice.

### **Study 2a: Temporal Contiguity Cues and Review Value**

Study 2a examines whether the result that temporal contiguity cues increase the value of positive reviews more than negative reviews is replicated in a controlled setting.

#### **Procedure**

Seventy-three (40 female) respondents from an online panel participated for pay. Respondents were randomly assigned to one of four 2 (review valence: positive vs. negative)  $\times$  2 (temporal contiguity cues: present vs. absent) between-subjects conditions.

The stimuli were developed by randomly selecting a positive review from the Yelp dataset with the same text length as the sample average. The selected review contained no temporal contiguity cues. To create the negative review, positive adjectives were replaced by negative ones. For example, “food is inspired” was changed to “food is uninspired.” In the temporal contiguity cues present conditions, the words “just got back” and “tonight” were inserted into the reviews. These cues were omitted in the temporal contiguity cues absent conditions. In all four reviews, the restaurant was renamed “Joe’s” to control for possible familiarity with the actual restaurant and this name was displayed alongside the review.

Participants first read the review and then assessed review value. This was followed by a check for the valence manipulation. Also, because perceived similarity between information senders and receivers can affect the perceived value of word-of-mouth communication (Feldman 1984), an alternative explanation for our finding could

be that readers think they are more similar to reviewers who communicate positive news immediately after the experience. Accordingly, perceived similarity was measured.

## **Measures**

### Perceived Value

Review value was measured on a nine-point scale adapted from Sen and Lerman (2007): “Assuming that you were thinking about going to Joe’s in real life, how likely would you be to use this review in your decision-making?” (1 = very unlikely, 9 = very likely).

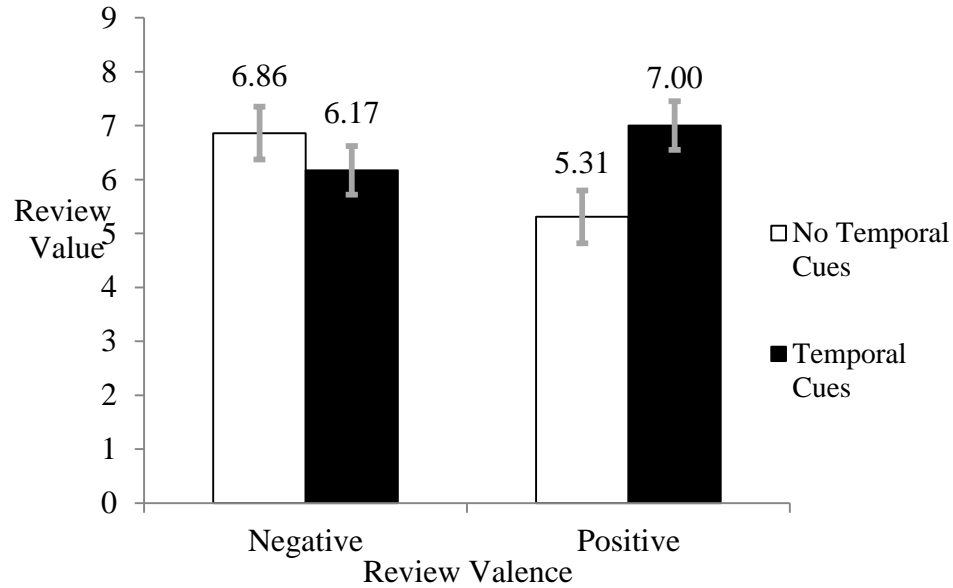
### Perceived Valence

As a manipulation check, participants indicated how positive versus negative they perceived the review to be (1 = very negative, 9 = very positive).

### Perceived Similarity

Participants were asked how similar to the reviewer they believed themselves to be (1 = very dissimilar, 9 = very similar).

## Results



**Figure 16: Perceived Value as a Function of Review Valence and Presence of Temporal Contiguity Cues (Study 2a)**

### Perceived Value

In support of Hypothesis 1, and replicating the results of Study 1, there was a significant valence  $\times$  temporal contiguity interaction ( $F(1, 69) = 6.03, p < .05$ ; see Figure 16). Planned contrasts show that for negative reviews, temporal contiguity had no significant effect on perceived value ( $M_{\text{neg cues}} = 6.17$  vs.  $M_{\text{neg no cues}} = 6.85, F(1, 69) = 1.09, p = .30$ ). For positive reviews, however, the presence of temporal contiguity cues significantly increased review value ( $M_{\text{pos cues}} = 7.00$  vs.  $M_{\text{pos no cues}} = 5.31, F(1, 69) = 5.69, p < .05$ ). A different set of planned contrasts show that, in the absence of temporal contiguity cues, negative reviews were regarded as more valuable than positive reviews ( $M_{\text{neg no cues}} = 6.85$  vs.  $M_{\text{pos no cues}} = 5.31, F(1, 69) = 5.11, p < .05$ ). However, this negativity bias disappeared when temporal contiguity cues were provided ( $M_{\text{neg cues}} = 6.17$

vs.  $M_{\text{pos cues}} = 7.00$ ,  $F(1, 69) = 1.47$ ,  $p = .23$ ). Neither the presence of temporal contiguity cues nor review valence had a significant main effect on review value.

### Perceived Valence

The manipulation of review valence was successful. Those in the negative review condition indicated the review was more negative than those in the positive condition ( $M_{\text{neg}} = 1.52$  vs.  $M_{\text{pos}} = 8.92$ ,  $F(1, 69) = 2136.54$ ,  $p < .01$ ). The main and interaction effects of the presence of temporal contiguity cues were not significant ( $F$ 's  $< 1$ ).

### Perceived Similarity

Perceived similarity to the reviewer was not affected by review valence, temporal contiguity cues, or their interaction (all  $F$ s  $< 1$ ).

## **Discussion**

The results of Study 2a provide further evidence for Hypothesis 1 by showing that the presence of temporal contiguity cues increases the perceived value of positive reviews to a greater extent than negative reviews. Study 2a also replicates the earlier result showing that the presence of temporal contiguity cues can take away the negativity bias. In other words, results from Study 1 are replicated in a lab setting that controls for selection and unobserved variable issues that may be present in field data. Study 2b examines the proposed mechanism for these effects by measuring attributions of reviews to the reviewer (vs. product experience).

### **Study 2b: Temporal Contiguity Cues and Attributions**

Study 2b tests whether, in the absence of temporal contiguity cues, positive reviews are more attributed to the reviewer (vs. product experience) than negative

reviews (Hypothesis 2). Study 2b also examines whether the presence of temporal contiguity cues increases the degree to which readers attribute reviews to the product experience (vs. reviewer) to a greater extent for positive than for negative reviews (Hypothesis 3).

## **Procedure**

Sixty-nine respondents (forty-two females) from an online subject pool, different from those in Study 2a, participated for pay. Stimuli were identical to Study 2a and participants were randomly assigned to one of the four between-subject conditions. Instead of rating reviews on value, participants were asked to make attributions about the cause of the review.

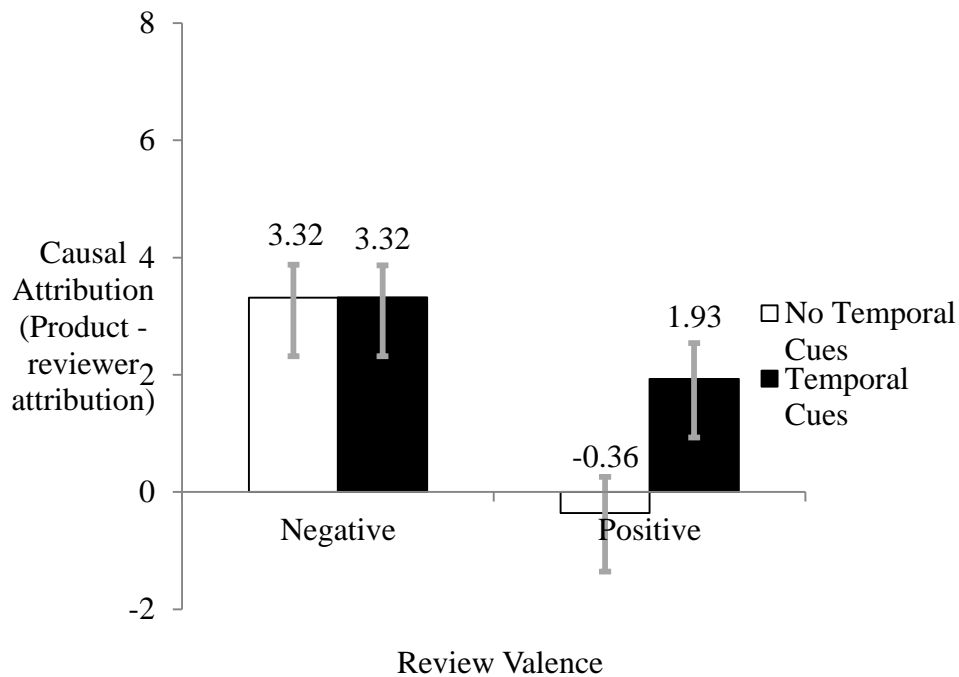
## **Measures**

I assessed causal attributions using measures adapted from Frank and Gilovich (1989). Reviewer attribution was measured by asking participants to indicate how big of a role personal factors (the reviewer's personality, traits, character, personal style, attitudes, mood, and so on) played in the reviewer's decision to write the review (1 = minimal role, 9 = maximal role) and product attribution was measured by asking participants to indicate how big of a role the restaurant experience (food quality, service, etc.) played in the decision to write the review (1 = minimal role, 9 = maximal role). Following Frank and Gilovich, a causal score was calculated by subtracting reviewer from product attributions such that higher scores indicated greater product (lesser reviewer) attributions.

## Results

Supporting Hypothesis 2, when temporal contiguity cues were absent, positive reviews were significantly more attributed to the reviewer (vs. product experience) than negative reviews ( $M_{\text{pos no cues}} = -.36$  vs.  $M_{\text{neg no cues}} = 3.32$ ,  $F(1, 65) = 12.04$ ,  $p < .01$ ). When temporal contiguity cues were present, this difference in causal attributions was no longer statistically significant ( $M_{\text{pos cues}} = 1.93$  vs.  $M_{\text{neg cues}} = 3.32$ ,  $F(1, 65) = 1.83$ ,  $p > .10$ ).

Supporting Hypothesis 3, there was a significant interaction between review valence and temporal contiguity cues ( $F(1, 65) = 4.71$ ,  $p < .05$ ; see Figure 17). Planned comparisons show that the presence of temporal contiguity cues increased product (vs. reviewer) attributions to a greater extent for positive ( $M_{\text{pos cues}} = 1.93$  vs.  $M_{\text{pos no cues}} = -.36$ ,  $F(1, 65) = 4.05$ ,  $p < .05$ ) than for negative reviews ( $M_{\text{neg cues}} = 3.32$  vs.  $M_{\text{neg no cues}} = 3.32$ ,  $F(1, 65) < 1$ ).



**Figure 17: Causal Attribution as a Function of Review Valence and Presence of Temporal Contiguity Cues (Study 2b)**

Overall, positive reviews were more attributed to the reviewer (vs. product experience) than negative reviews ( $M_{\text{pos}} = .79$  vs.  $M_{\text{neg}} = 3.32$ ,  $F(1, 65) = 7.65$ ,  $p < .01$ ). However, this main effect should be interpreted in light of the significant interaction between review valence and temporal contiguity cues. The main effect of temporal contiguity cues was not significant ( $M_{\text{cues}} = 2.78$  vs.  $M_{\text{no cues}} = 1.76$ ,  $F(1, 65) = 2.41$ ,  $p > .10$ ).

## Discussion

Results of Study 2B suggest that temporal contiguity cues boost the value of positive reviews by increasing relative attributions to the product (vs. reviewer). When temporal contiguity cues are missing, positive reviews are relatively more attributed to the reviewer (vs. product experience) than negative reviews. However, when temporal contiguity cues are present, differences in causal attributions for positive versus negative reviews are no longer significant.

While my results show that temporal cues affect *relative* attributions to the product experience versus reviewer, one might wonder if this is due primarily to changes in reviewer or product attributions. To examine this, I analyzed reviewer and product attributions separately. Results revealed a significant interaction between valence and the presence of temporal contiguity cues on reviewer attributions ( $F(1, 65) = 4.61$ ,  $p < .05$ ). In the absence of temporal contiguity cues, positive reviews were significantly more attributed to the reviewer than negative reviews ( $M_{\text{pos no cues}} = 7.08$  vs.  $M_{\text{neg no cues}} = 3.95$ ,  $F(1, 65) = 20.11$ ,  $p < .001$ ). However, in the presence of temporal contiguity cues, this difference in reviewer attributions was no longer significant ( $M_{\text{pos cues}} = 5.15$  vs.  $M_{\text{neg cues}} = 4.10$ ,  $F(1, 65) = 2.50$ ,  $p = .12$ ). Specifically, the presence of temporal contiguity cues



decreased reviewer attributions to a greater extent for positive reviews ( $M_{\text{pos cues}} = 5.15$  vs.  $M_{\text{pos no cues}} = 7.08$ ,  $F(1, 65) = 6.46$ ,  $p = .01$ ) than negative reviews ( $M_{\text{neg cues}} = 4.10$  vs.  $M_{\text{neg no cues}} = 3.95$ ,  $F(1, 65) = .06$ ,  $p = .81$ ). Absolute attribution to the product was high ( $M_{\text{all}} = 7.28$ ) and was not significantly affected by review valence, the presence of temporal contiguity cues, or their interaction (all  $F$ 's  $< 1$ ). These results show that temporal contiguity cues work primarily by changing reviewer rather than product attributions.

### **Study 3: The Mediating Role of Attributions**

Although I showed that temporal contiguity cues increase the value of positive reviews (Study 2A) and decrease attributions to the reviewer (Study 2b), it is uncertain whether these two effects are related. I address this issue in Study 3 by testing whether causal attributions mediate the interactive effect of temporal contiguity and review valence on review value. In addition, I examine whether alternative processes explain my findings. Namely, I test whether perceptions of emotional expression, rashness, sincerity, politeness, and review freshness are significant mediators of my effect.

Moving away from the restaurant domain, I also test whether my findings replicate using cruise reviews. On average, people have more experience with restaurants than cruises. Whereas the average American goes out to eat several times a week, only 20 percent of Americans have ever been on a cruise (Cruise Lines International Association 2010). Furthermore, in comparison to dining experiences, cruise experiences involve greater time and money. While individuals are free to leave a restaurant at any point, once the ship has left the dock, leaving a cruise early is difficult. In sum, cruises differ

from restaurants in several important ways and replicating my effects in this domain would help generalize my findings.

## **Procedure**

Ninety-eight people (46 females) from an online forum participated for pay. They were randomly assigned to read one of four 2 (review valence: positive vs. negative)  $\times$  2 (temporal contiguity cue: present vs. absent) cruise reviews. The stimuli were modified from a real review from a popular cruise review website (cruisecritic.com). As in Study 2, stimuli were developed by first choosing a positive review and then creating a negative review by replacing positive adjectives with their negative counterparts. Temporal contiguity was manipulated by inserting the phrase “Just got back from the cruise” into the review. A made-up name (“Magic Sail”) was used to avoid issues of familiarity. As in Study 2, participants first read a review and then assessed review value. They then provided ratings of causal attributions and other potential mediators. Finally, they rated review valence as a manipulation check.

## **Measures**

### Review Value

Review value was measured with the same nine-point scale used in Study 2a, where higher scores indicate greater value.

### Causal Attributions

To show that my observed findings are not due to the transformation of the raw causal scores (i.e., subtracting reviewer from product attributions), I used a bipolar scale trading off product and reviewer attributions. I again adapted the measures used by Frank

and Gilovich (1989) and asked participants how important were personal factors versus cruise characteristics (quality, food, amenities, etc.) in causing the reviewer to write the review (1 = personal characteristics are most important, 9 = cruise characteristics are most important). As in Study 2a, higher scores mean higher product (vs. reviewer) attributions.

### Other Potential Mediators

To rule out alternative processes that could potentially explain my findings, I measured reviews on politeness (1 = not at all polite, 9 = very polite), sincerity (1 = not at all sincere, 9 = very sincere), rashness (1 = not at all rash, 9 = very rash), emotional expression (1 = not at all emotional, 9 = very emotional), and freshness (i.e., “How long ago was this review written?” 1 = a long time ago, 9 = pretty recently).

### Manipulation Checks

As a valence manipulation check, participants rated how positive versus negative they found the review (1 = very negative, 9 = very positive). I also asked individuals to indicate “How long after having the cruise experience did the reviewer write this review?” (1 = immediately after, 9 = after a long time) to see whether the presence of temporal contiguity cues affects perception of delay between the product experience and review-writing.

## **Results**

### Review Value

Further supporting Hypothesis 1, there was a significant interaction between review valence and temporal contiguity ( $F(1, 94) = 4.34, p < .05$ ). Planned comparisons

show that the presence of a temporal contiguity cue increased the perceived value of positive ( $M_{\text{pos cue}} = 8.08$  vs.  $M_{\text{pos no cue}} = 7.36$ ,  $F(1, 94) = 5.33$ ,  $p < .05$ ) but not negative reviews ( $M_{\text{neg cue}} = 8.08$  vs.  $M_{\text{neg no cue}} = 8.29$ ,  $F < 1$ ). In the absence of a temporal contiguity cue, negative reviews were regarded as more valuable than positive reviews ( $M_{\text{neg no cue}} = 8.29$  vs.  $M_{\text{pos no cue}} = 7.36$ ,  $F(1, 94) = 8.73$ ,  $p < .01$ ). However, in the presence of a temporal contiguity cue, this difference went away ( $M_{\text{neg cue}} = 8.08$  vs.  $M_{\text{pos cue}} = 8.08$ ,  $F < 1$ ).

There was no main effect of temporal contiguity on review value ( $F(1, 94) = 1.32$ ,  $p = .25$ ). There was a significant main effect of valence on review value, where negative reviews were more valuable than positive ones ( $M_{\text{neg}} = 8.19$  vs.  $M_{\text{pos}} = 7.72$ ,  $F(1, 94) = 4.40$ ,  $p < .05$ ), but this result should be interpreted in light of the significant interaction between review valence and temporal contiguity.

### Causal Attributions

Again supporting H2, in the absence of a temporal contiguity cue, positive reviews were significantly more attributed to the reviewer (vs. product) than negative reviews ( $M_{\text{pos no cue}} = 5.84$  vs.  $M_{\text{neg no cue}} = 7.33$ ,  $F(1, 94) = 7.58$ ,  $p < .01$ ). In the presence of a temporal contiguity cue, this difference no longer existed ( $M_{\text{pos cue}} = 7.20$  vs.  $M_{\text{neg cue}} = 7.00$ ,  $F(1, 94) = .14$ ,  $p > .50$ ). Further supporting H3, there was a significant interaction between valence and temporal contiguity ( $F(1, 94) = 4.87$ ,  $p < .05$ ). For negative reviews, the presence of a temporal contiguity cue did not significantly affect causal attributions ( $M_{\text{neg cue}} = 7.00$  vs.  $M_{\text{neg no cue}} = 7.33$ ,  $F < 1$ ). For positive reviews, however, the presence of a temporal contiguity cue significantly increased the extent to which readers attributed the review to the product experience (vs. reviewer;  $M_{\text{pos cue}} = 7.20$  vs.  $M_{\text{pos no cue}} = 5.84$ ,

$F(1, 94) = 6.42, p < .05$ ). The main effect of temporal contiguity on attribution was not significant ( $M_{\text{cue}} = 7.10$  vs.  $M_{\text{no cue}} = 6.57, F(1, 94) = 1.79, p > .10$ ). Although positive reviews were marginally more attributed to the reviewer (vs. product experience) than negative reviews ( $M_{\text{pos}} = 6.52$  vs.  $M_{\text{neg}} = 7.17, F(1, 94) = 2.84, p < .10$ ), this result should be interpreted with respect to the significant interaction between valence and temporal contiguity.

To test whether causal attributions mediate review value, I conducted a moderated mediation analysis with temporal contiguity as the independent variable (0 = no cue, 1 = with cue), valence as the moderator (0 = negative, 1 = positive), causal attributions as the mediator, and review value as the dependent variable (Model 7, Hayes 2012). I used bootstrapping to generate a 95% confidence interval around the indirect effect of attributions, where successful mediation occurs if the confidence interval does not contain zero (Preacher, Rucker, and Hayes 2007; Zhao, Lynch Jr, and Chen 2010).

Again, the effect of temporal contiguity on causal attributions was moderated by valence ( $\beta = 1.69, SE = .77, t(94) = 2.21, p < .05$ ). For negative reviews, the presence of a temporal contiguity cue did not significantly affect relative attributions ( $\beta = -.33, SE = .55, t(94) = -.71, p = .54$ ). For positive reviews, however, the presence of a temporal cue increased attributions to the product (vs. reviewer;  $\beta = 1.36, SE = .54, t(94) = 2.53, p < .05$ ) and greater product (vs. reviewer) attributions, in turn, positively affected review value ( $\beta = .30, SE = .04, t(94) = 5.61, p < .001$ ). Conditional indirect effects show that, for negative reviews, the presence of a temporal contiguity cue failed to increase review value because it had little effect on relative attributions (95% CIs:  $-.49$  to  $.27$ ). For

positive reviews, however, temporal contiguity increased review value by changing causal attributions (95% CIs: .14 to .81).

### Other Potential Mediators

In addition to testing causal attributions, I also tested the moderated mediating effects of reviewer politeness, sincerity, rashness, emotional expression, and review freshness to see whether these alternative processes could explain my results. Following Zhao et al.'s (2010) recommendations, these potential mediators were tested simultaneously alongside causal attributions. Aside from causal attributions, none of these measures successfully mediated my observed finding as confidence intervals generated around politeness, sincerity, rashness, emotional expression, and freshness all include zero.<sup>2</sup> (See Appendix E for full mediation results.)

### Manipulation Checks

Positive reviews were seen as significantly more positive than negative reviews ( $M_{\text{pos}} = 8.72$  vs.  $M_{\text{neg}} = 1.42$ ,  $F(1, 94) = 1988.74$ ,  $p < .001$ ) and perceived valence was unaffected by temporal contiguity and its interaction with valence ( $F$ 's  $< 1$ ). Those in the temporal contiguity cue present conditions believed that the review was written more immediately after the cruise experience than those in the no temporal contiguity cue conditions ( $M_{\text{cue}} = 2.53$  vs.  $M_{\text{no cue}} = 3.55$ ,  $F(1, 94) = 11.68$ ,  $p = .001$ ). There was neither a main effect of valence nor an interaction between valence and temporal contiguity ( $F$ 's

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<sup>2</sup> Although valence and temporal contiguity interacted to affect politeness and sincerity, politeness and sincerity did not significantly affect review value ( $\beta_{\text{polite}} = .002$ ,  $SE = .05$ ,  $p = .97$ ;  $\beta_{\text{sincerity}} = .13$ ,  $SE = .08$ ,  $p > .10$ ), thus nullifying mediation.

< 1). This finding shows that the presence of a temporal contiguity cue increases the perceived temporal proximity between the product experience and the review.

#### *Ancillary Study and Analyses*

One possibility is that the effects of temporal contiguity on review value are driven by increased perceptions of information freshness rather than the extent to which positive reviews are attributed to the product experience versus the reviewer. That is, temporal contiguity cues make readers think that the review reflects a more recent consumption experience and is therefore more valuable. To examine this possibility, I ran a 2 (review valence: positive vs. negative)  $\times$  2 (temporal contiguity cue: present vs. absent)  $\times$  2 (temporal delay vs. information freshness) between-subject study with 230 members of an online panel. Participants were randomly shown one of the four reviews used in the main study and then either presented with a measure assessing temporal contiguity “How long after the cruise experience did the reviewer write the review?” (1 = immediately after, 9 = after a long time) or a measure assessing information freshness “How long ago did the cruise experience occur?” (1 = a very long time ago, 9 = pretty recent). Replicating the result of the main study, and counter to an information freshness explanation, separate analyses of each measure show that the presence of a temporal contiguity cue reduced perceptions of temporal delay between consumption and review-writing ( $M_{\text{cue}} = 2.79$  vs.  $M_{\text{no cue}} = 3.47$ ,  $F(1, 114) = 4.81$ ,  $p = .03$ ) but did not significantly affect perceptions of information freshness ( $M_{\text{cue}} = 7.26$  vs.  $M_{\text{no cue}} = 7.10$ ,  $F(1, 108) = .22$ ). No other effects were significant.

## **Discussion**

The results of Study 3 show the potential process through which temporal contiguity cues mitigate the negativity bias in online reviews. Specifically, the presence of a temporal contiguity cue may increase the value of positive reviews by increasing the extent to which readers attribute positive reviews to product versus reviewer characteristics. For negative reviews, however, temporal contiguity does not significantly affect reader attributions or review value.

### **Study 4: Effects on Choice**

Study 4 examines whether temporal contiguity cues also affect choice. Positive reviews persuade people to choose the reviewed product whereas negative reviews persuade people to *not* choose the product. If temporal contiguity cues augment the value of positive reviews more than negative ones, they should have a stronger effect on increasing the choice of positively reviewed products than on decreasing the choice of negatively reviewed products.

## **Procedure**

One hundred and eighty people (89 females) from an online panel participated in the study for pay and were asked to imagine they were picking a restaurant for dinner. They were randomly assigned to one of four  $2$  (review valence: positive vs. negative)  $\times$   $2$  (temporal contiguity cues: present vs. absent) between-subjects conditions. In each condition, participants were shown one of the four reviews used in Studies 2a and 2b for “Joe’s Restaurant” (the target restaurant) and a neutral review for “Mike’s Restaurant” (which was identical in all conditions). Participants were asked which restaurant they preferred and, to increase the external validity of the study (Dhar 1997), were given the



option of choosing “neither restaurant.” I predicted that the presence of temporal contiguity cues in a positive review would increase choice of the target restaurant more than their presence in a negative review would decrease choice of the target restaurant.

## Results

The choice data were analyzed with two partial Chi-squares, one for positive reviews and one for negative reviews. (The presence of perfect prediction in my data rendered the logit inadequate [Albert and Anderson 1984].) Results (see Table 3) reveal that, when the review of the target restaurant was negative, the presence of temporal contiguity cues did not significantly affect choice of the target restaurant (without cues = 4.5% vs. with cues = 11.6%, Fisher’s exact test:  $p = .27$ ). However, consistent with my prediction, when the review of the target restaurant was positive, the presence of temporal contiguity cues significantly increased the choice of the target restaurant (without cues = 85.7 % vs. with cues = 100%, Fisher’s exact test:  $p = .01$ ).

**Table 3: Percent Choosing Each or Neither Restaurant as a Function of Valence and Presence of Temporal Contiguity Cues (Study 4)**

<i>Valence</i>	<i>Temporal Contiguity Cues</i>	<i>Target (Joe’s)</i>	<i>Not Target (Mike’s + Neither)</i>	<i>Not Target Break Down</i>	
				<i>Mike’s</i>	<i>Neither</i>
Negative	Absent	4.5%	95.5%	45.5%	50.0%
	Present	11.6%	88.4%	51.2%	37.2%
Positive	Absent	85.7%	14.3%	4.8%	9.5%
	Present	100.0%	0%	0%	0%

## Discussion

Results of Study 4 show that the effects of temporal contiguity cues extend to choice. As with review value, the presence of temporal contiguity cues has a stronger effect on choice when present in positive than negative reviews. In this case, the presence of temporal contiguity cues in a positive review boosted choice of the reviewed product

to 100% but their presence in a negative review did not similarly decrease choice likelihood.

### **General Discussion**

This research shows that temporal contiguity cues mitigate the negativity bias in online reviews. One possible mechanism is that temporal contiguity cues reduce the extent to which consumers attribute positive reviews to the reviewer versus the product experience. In the absence of temporal contiguity cues, consumers are relatively more likely to attribute positive reviews to the reviewer (vs. product experience) than negative reviews. By connecting the review to the product experience, the presence of temporal contiguity cues enhances the value and influence of positive reviews. In other words, temporal contiguity cues reduce the negativity bias by shifting consumer beliefs about the cause of positive reviews. The presence of temporal contiguity cues in negative reviews has limited effects on causal attributions, perceptions of value, or choice. One explanation is that there may be fewer personal reasons to communicate negative information.

In an analysis of restaurant reviews from Yelp.com (Study 1) I demonstrate that, in the absence of temporal contiguity cues, reviews become less valuable as they become more positive. However, when temporal contiguity cues are present, I no longer observe this negativity bias. Further, I demonstrate that temporal contiguity cues attenuate the negativity bias by boosting the value of positive reviews rather than by reducing the value of negative reviews. Study 2a replicates these results in a controlled setting where selection and unobserved variables issues are unlikely to affect outcomes.

In subsequent lab experiments, I find support for the proposed attribution mechanism. In Study 2b, when temporal contiguity cues are missing, consumers attribute positive reviews more than negative reviews to the reviewer (vs. product experience). However, when temporal contiguity cues are present, differences in causal attributions for positive and negative reviews are no longer significant. Study 3 uses a different context, replicates the findings of Studies 1 and 2, and shows that these effects are mediated by attributions about review causes. Study 3 also rules out other potential mediators and alternative explanations for the effect. Study 4 shows that these results extend to choice. The presence of temporal contiguity cues in positive reviews increases the likelihood that a product is chosen for consumption but does not significantly affect the influence of negative reviews on choice.

## **Contributions**

I propose an attribution account of the negativity bias in online WOM based on consumers' naïve beliefs about the extent to which reviews reflect the writer's product experience. My account deviates from frequency accounts for the negativity bias, which posit that positive information is less valued because it is more common than negative information; my account also deviates from frequency-based attribution accounts of the negativity bias, which propose that people make different attributions as a result of the relative frequency of positive versus negative information. Rather, I propose that temporal contiguity cues mitigate the negativity bias by changing reader inferences about the source of WOM.

Despite early suggestions that temporal contiguity matters for attributions about human behavior (Kelley 1973), there has been little empirical investigation of these ideas.

This research shows that temporal contiguity affects causal attributions in social as well as physical domains. Although temporal contiguity cues are a small percentage of review text, they have strong effects on the value and influence of reviews in lab and real world settings.

This work also has implications for marketers worried about the excessive impact of negative reviews. While business owners can respond to negative reviews in hopes of thwarting their impact, such maneuvers may exacerbate the situation (Wehrum 2009). However, knowing that temporal contiguity cues increase the usefulness of positive but not negative reviews, marketers can encourage consumers to review products immediately after consumption and to *explicitly* communicate the recency of these experiences in their reviews (e.g., “If you liked your experience here today, please review us on Yelp and say you were here today!”).

In addition, I contribute methodologically by showing how hand coding of psychological constructs can be reliably combined with automatic processes to extract meaningful variables from large amounts of text data. Although behavioral researchers are providing valuable insights into real world WOM behavior by manually coding secondary text (e.g., Moore 2012; Schlosser 2011), the labor intensiveness of hand coding limits its application to relatively small datasets. Although automatic coding is common in computer science, and growing in psychology (e.g., Niederhoffer and Pennebaker 2009) and marketing (e.g., Tirunillai and Tellis 2012), there have been few attempts to manually develop context-specific dictionaries and apply automatic processes for large-scale coding. Using a novel coding scheme, I automated and validated the

coding of temporal information. This enabled me to use all the reviews in my dataset, providing assurance that my findings are not due to fortuitous sampling.

More generally, this article contributes to a better understanding of the psychological processes through which online WOM affects consumer behavior. Though it is known that WOM affects firm and product performance (Godes and Mayzlin 2004; Tirunillai and Tellis 2012), little is known about why certain types of WOM communication are more impactful than others. This article adds to recent work exploring the psychological underpinnings of WOM communication (Berger and Schwartz 2011; Cheema and Kaikati 2010) by examining how consumers' naïve theories about WOM affect its value.

### **Limitations and Directions for Future Research**

Although my approach is consistent with prior research demarcating person versus non-person causes of actions (Frank and Gilovich 1989), and I ruled out a number of alternative mediators, additional research could further explore the mechanisms behind these effects. For example, positive reviews might be attributed to self-enhancement or social desirability motives and the presence of temporal contiguity cues may change these attributions. Temporal contiguity cues may also convey greater excitement on the part of the reviewer, signaling readers to pay more attention than normal to positive information. A more detailed exploration of the mechanism through which these effects occur is likely to enrich our understanding of the psychological processes that affect the impact of WOM. More generally, there is an opportunity to examine how cues to temporal contiguity affect causal reasoning in social settings

Future research could also examine contexts in which negative reviews are more

attributed to the reviewer and therefore less influential than positive reviews. One possible situation is when a negative review comes from a reviewer who is known to always write negative reviews. Another is when a negative review comes from a known competitor or someone loyal to a competing brand. It would be interesting to see if the presence of temporal contiguity cues could overcome these attributions. Other research could explore moderators that affect the extent to which people attribute positive versus negative WOM to the reviewer. As consumers grow evermore reliant on reports about others' product experiences to form their own preferences, understanding the factors that affect the value of these reports is increasingly important.

## **CHAPTER 5**

### **CONCLUSION**

More and more are consumers turning to strangers online for product advice. In my dissertation, I use a combination of field data (e.g., Yelp reviews) and experimental data to examine how social considerations – thoughts about others – may influence consumers’ online word of mouth behavior. Across the previous three chapters, I explore how people’s word of mouth decision is dictated by concerns of social acceptance (chapter 2), how the desire to appear logical to others may impair word of mouth senders’ memory (chapter 3), and how consumers judge received word of mouth based on their theories about why others have decided to communicate this information in the first place (chapter 4). The specifics are as follows:

In chapter 2, I test the lay belief that controversy generates buzz. That is, do people actually choose controversial topics for word of mouth? Disconfirming popular belief, I find that controversy does not always generate conversation and that in many cases (e.g., talking to strangers in a face to face setting), controversy may discourage conversations altogether. When people are deciding whether or not they want to talk about a controversial topic, two opposing processes are in play: on the one hand, as topics become more controversial, they become more interesting to people (which makes people want to talk about the topic); on the other hand, as topics become more controversial, people also feel more uncomfortable bringing up the topic because they don’t want to be socially rejected by their conversation partners.

In chapter 3, I ask the question – how does people’s desire to communicate logical (vs. imagery-based) word of mouth affect their memory for the product experience? Prior work shows that memory is facilitated when people are in the same mindset during stimulus encoding and subsequent memory test. I theorize that product experiences are encoded perceptually and that communication of logical word of mouth will lead to a decrease in activation of perceptual mindset relative to communication of imagery-based word of mouth. As a result of this mismatch in encoding and retrieval mindset, those who aim to communicate logical word of mouth tend to have worse memory for the underlying product experience than those who communicate imagery-based word of mouth. Chapter 3 shows that people’s goals during word of mouth transmission may have unanticipated effects on their memory – the desire to appear logical ironically hurt people’s memory for the actual product.

Unlike chapters 2 and 3, chapter 4 focuses more directly on the word of mouth receiver. I show that in the absence of temporal contiguity cues (words and phrases indicating word of mouth was communicated immediately after product consumption), receivers tend to discount positive reviews. However, in the presence of temporal contiguity cues, positive and negative reviews are valued more equally. I find that this is driven by temporal contiguity cues changing receivers’ perception about why word of mouth was communicated. Relative to negative reviews, positive reviews are relatively more attributed to reviewer’s own goals and motivations (e.g., gain other’s liking, signal expertise/competence). Temporal contiguity cues connect the positive reviews more to the underlying product, decreasing perceptions that positive reviews are written for reviewer-specific reasons.



Taken together, my dissertation makes theoretical contributions to several research streams (e.g., persuasion, social influence, causal perception, consumer memory, etc.). Importantly, I showcase the complex psychological processes that operate in online environments, where people are unlikely to know one another and are unlikely to ever meet one another. Even in these situations, people care about how others perceive them (e.g., avoid talking about highly controversial topics because people don't want to be socially rejected).

Furthermore, my dissertation yields recommendations for practice. While it is undoubtedly important to know *what* people are doing in online word of mouth forums (e.g., how many people write reviews, what percent of reviews are negative, etc.), I argue that knowing *why* people behave the way they do will give practitioners even greater ability to influence word of mouth and optimize word of mouth infrastructure.

For example understanding that people avoid controversial topics because of social rejection concerns (chapter 2), firms that rely on controversial viral campaigns can maximize the success of their controversial campaigns by launching these campaigns on platforms where social concerns are less salient such as online communities where members do not reveal identity (vs. require identity disclosure). Also, knowing that temporal contiguity cues can asymmetrically increase the value of positive reviews (chapter 4), firms can encourage consumers to review products soon after consumption experience and encourage them to include information about consumption time in the word of mouth. More generally, knowing that temporal contiguity cues increase impact of positive information by changing attributions, firms can enact other strategies aimed at decreasing attribution of positive reviews to the reviewer.

From the infrastructure side, my dissertation makes at least two suggestions. First, most product review websites (e.g., Amazon, Yahoo) currently prompt consumers for logical reviews. Given that writing logical reviews are more likely to impair consumers' memory of the experience (chapter 3), imagery-based word of mouth may be elicited to help consumers preserve their memory. (In an ongoing project, I find evidence that imagery-based word of mouth is just as influential, if not more influential, than logical reviews). My dissertation also suggests that word of mouth platforms should solicit reviewers for product consumption time. I show in chapter 4 that word of mouth receivers use timing information regarding consumption and review-writing when judging whether or not they should rely on a review.

Given its popularity, online consumer word of mouth has received much attention within the last five years (e.g., Miller 2009). For many, posting online reviews has become a natural part of their lives and potential consumers often turn to online forums as the first place they visit when attempting to find product information. Given the popularity of online word of mouth and its tremendous impact on firm performance, understanding the psychological processes embedded in online word of mouth will not only allow us to better understand how consumers interact with each other, but will also provide invaluable insights for marketers.

## **APPENDIX A**

### **14 TRUE/FALSE MEMORY ITEMS USED IN STUDIES 1 AND 2 (CHAPTER 3)**

- The name of the film is “Octopus in Love” (False)
- The truck has 4 wheels (False)
- The color of the truck is green (True)
- A picture of a fish is painted on the side of the truck (False)
- The color of the abducted octopus (at the beginning of the video) is orange (False)
- The driver of the truck has brown hair (True)
- The driver of the truck wears a black shirt (False)
- The truck nearly hit 2 people on the street (False)
- The truck crashes into the water (True)
- The orange octopus is grabbed by the seagull (True)
- The octopuses jumped through swimming pools (True)
- The video ends with both octopuses on powerlines (False)
- The driver has an octopus keychain (True)
- The octopuses bounce on a blue-and-white striped umbrella (True)

\*note: the items were shown to participants in a randomized order

## **APPENDIX B**

### **14 TRUE/FALSE MEMORY ITEMS USED IN STUDY 3 (CHAPTER 3)**

- The reviewed camera was Canon PowerShot (True)
- The camera was released in 2010 (True)
- The camera is black in color (False)
- The camera is a 16 mega pixel camera (True)
- The camera has a new image processor for better photo and video quality over previous version that it replaced (True)
- The camera has the same lens as the previous version that it replaced (False)
- The user can control the aperture and shutter speed (False)
- The camera offers creative and photo effects (True)
- The camera can capture HD video (True)
- The camera can't support slow motion videos (False)
- The camera captures pictures at the same speed as mobile phones (False)
- The power button is located on the top of the camera (True)
- The zoom button is located on the back of the camera (False)
- The camera brand is displayed vertically on the front of the camera (False)

\*note: the items were shown to participants in a randomized order

## APPENDIX C

### SAMPLE YELP REVIEW (CHAPTER 4)



## APPENDIX D

### TEXT DICTIONARY FOR TEMPORAL CODING OF YELP REVIEWS (CHAPTER 4)

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<i>Key Words</i>	
Temporal contiguity cues	Today, this morning, just got back, tonight
Other temporal cues	Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday, yesterday, last night, last week, weekend, weekday, last month, last year

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**APPENDIX E:**

**MEDIATION RESULTS OF STUDY 3 (CHAPTER 4)**

Mediators	<i>IV → Mediator</i>			<i>Mediator → DV</i>	<i>Conditional Indirect Effects</i> ( <i>Bootstrapped 95% CI<sup>a</sup></i> )	
	Valence (0 = negative, 1 = positive)	Cue (0 = no cue, 1 = with cue)	Valence × cue	Mediator → value	Positive Review	Negative Review
Sincerity	-.01 ( .43)	-.83 (.44)	1.83 (.60)**	.13 (.08)	-.03 to .43	-.43 to .03
Politeness	2.20 (2.20)**	-.96 (.54)	1.76 (.73)*	-.002 (.05)	-.09 to .09	-.11 to .14
Rashness	-.15 ( .62)	1.17 (.63)	-1.29 (.88)	-.04 (.05)	-.06 to .11	-.27 to .07
Emotionalness	-.34 ( .59)	.25 (.59)	-.77 (.83)	.09 (.06)	-.28 to .03	-.05 to .17
Freshness	.36 ( .43)	.42 (.44)	.18 (.61)	-.04 (.07)	-.18 to .04	-.20 to .03
Attribution	-1.49 ( .54)	-.33 (.55)	1.69 (.76)*	.30 (.05)**	.14 to .81	-.49 to .27

\*significant at .05, \*\*significant at .01, standard errors in parenthesis.

<sup>a</sup> Successful mediation occurs when 0 is not included in the CI.

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